Transform Research and Development with SAP S/4HANA®
White Paper Background and Key Definitions

The information outlined below is helpful to understand the contents of this value proposition white paper. It gives clear details on the objective and scope of the paper. Key definitions are also provided for select sections of the paper to provide further clarification.

**DELIVERABLE OBJECTIVE**
Provides information on the value in moving from an ERP on a traditional database to SAP S/4HANA* and cloud and line-of-business (LoB) solutions

**KEY DEFINITIONS**
Within the process and sub-process deep-dives, there is detailed content in table format articulating the following:

- **Pain points**
  Represents major customer business and IT challenges

- **Current state with ERP on traditional database**
  Represents the ERP capabilities that are available on a traditional database

- **SAP S/4HANA capabilities**
  Represents the capabilities shipped with the latest release of SAP S/4HANA

- **Cloud/LoB + SAP S/4HANA capabilities**
  Represents all other solutions that can be integrated with SAP S/4HANA and provides business value. For example, SAP S/4HANA + the SAP Integrated Business Planning solution, or SAP S/4HANA + the SAP Manufacturing Integration and Intelligence (SAP MII) application, etc. These solutions are not embedded in SAP S/4HANA, but integration scenarios exist for these

- **Planned innovations and future direction**
  Represents new functionalities planned for future release of SAP S/4HANA, or new integration possibilities planned for SAP S/4HANA

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/enhancements of SAP S/4HANA + LoB and cloud enhancements that can drive value. Keep in mind that these should be used as a guide. We recommend working together to assess your current maturity and the value of moving to SAP S/4HANA in order to develop a personalized business case.

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**Detailed road map available on SAP.com (Customer Login Required)**

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SAP S/4HANA Research and Development Overview

The rapidly evolving digital landscape and personalized customer demands have fundamentally changed the way new products are developed and launched. In the digital world, new ideas, product usage information, and new requirements from customers are continuously flowing into the research and development (R&D) processes. Scientists and engineers are developing and iterating product pipeline at the speed of thought.

Digital tools are used for rapid design-prototype-test iterations to foster a “fail fast and fail cheap” approach. They also simplify the complexity in downstream processes such as manufacturing, service, and sales to execute a “lot size of one.” This is why an immediate, intelligent, and integrated product innovation platform is essential now for efficient product development, timely market introduction, and fundamentally better initiative success rates.

With SAP S/4HANA as their digital core, customers can iteratively and more collaboratively build a foundation for consumer-driven smart products that are brought to the market faster with full compliance and limitless configurations and variants.

Since the release of the SAP S/4HANA Enterprise Management solution in November 2015, the wave of digital business-enabling innovation in our next-generation business suite has spread throughout the enterprise, across finance, manufacturing, procurement, supply chain, and R&D.

SAP S/4HANA Research and Development allows companies to gain live visibility into idea pipeline, portfolio prioritization, project actual vs. budget, new product design, development history, and compliance across markets and categories.

Design processes are faster, smarter, and enriched with intelligent information. Live search on development history increases reuse and decreases time and investment in developments that go nowhere. Cost drivers are identified in the early stage of the product lifecycle to easily simulate costs and compare alternatives. Collaboration is enabled across extended design teams both within and outside the enterprise more simply and seamlessly in a secure cloud environment accessible anywhere and on any device. For discrete industries, a seamless CAD integration with market-leading authoring tools supports cross-discipline product definition. For process industries, key reports, such as finding the percentage of pure substance in all recipes for margin control, and key tasks, such as searching and editing multiple recipes, are run live. Decision processes are also simplified through intuitive visualization across the enterprise, for example, in manufacturing, service, and marketing. Engineering changes are made with full knowledge of downstream impact.

New innovations are run across the enterprise, and expert evaluation of new ideas is live with collaboration embedded from discovery to launch via a stage-gate approach. Performance of the innovation process is tracked, iterated, and monitored from idea to mass production. There is live planning, tracking, and monitoring of all deliverables from time, cost, and work-related aspects of projects. Internally and externally there are seamless staffing and service procurement workflow via the business network.

Compliance is embedded in the design process and live checks on new products for all markets and categories can be made with a cloud solution, dramatically improving the level of compliance in the context of increased customer and government pressure and transparency. Companies collaborate via cloud networks to collect compliance information from partners and suppliers and provide transparency to demanding customers and regulatory agencies across the product lifecycle.
TRANSFORM RESEARCH AND DEVELOPMENT ON SAP S/4HANA

New business models are being enabled by developing smart products that are connected intelligently to their ecosystem. The products are continually improved based on actual live and predictive usage data, driving higher customer satisfaction. Individualized products are enabled by a scalable, integrated execution environment across the networked enterprise, making the increased SKU complexity simple. Fluid variants and configurations are supported by machine learning to predict and correct compatibility and configuration issues.

SAP S/4HANA and associated solutions enable R&D to run as an integrated, smart, and responsive process from idea to product to production. These solutions unite the whole organization to bring new products to market faster and in multiple ways – visualization, access to development history, simple product data management for variants across product supply chain and lifecycle, research collaboration with external teams, and transparent compliance. They enable new business models using connected smart products and a “lot size of one.” With SAP S/4HANA, R&D is ready to meet the needs of customers in the digital age.

RESEARCH AND DEVELOPMENT CAPABILITIES

Outlined on the right are the primary capabilities for research and development where value can be achieved through SAP S/4HANA + SAP cloud and LoB solutions.

**Innovation and Project Control**

- Idea management
- Portfolio management
- Project management
- Resource management
- Project financials control
- Project logistics control

**Product Development**

- Product development foundation (e.g., document management change management)
- Product development
- Recipe development
- Authoring tool integration
- Product costing
- Bill of material and routing management
- Variant configuration and classification
- Handover to manufacturing
- Product compliance
SAP S/4HANA Research and Development Overview

SAP S/4HANA RESEARCH AND DEVELOPMENT VALUE PROPOSITION SUMMARY

SAP S/4HANA enables companies to integrate, embed intelligence, and visualize the entire R&D process from idea to product to production. Smart new, individualized products can be developed with full compliance and shorter time to market.

- Run design processes on live insights into customer needs and market opportunities
- Perform multi-level “what if” analyses with predictive insights to drive better design decisions
- Analyze live performance of the project portfolio with predictive insights at any stage of the innovation process
- Simplify access to project information for stakeholders and team members with the ability to drill down
- Define and analyze product costs and manage all engineering changes along the lifecycle effectively
- Create a platform as the single digital backbone of product data for internal and external collaborations across the enterprise
- Provide connected design capabilities, integrating requirements, mechanics, electronics, software components, and simulation, as well as synchronizing all downstream product development needs internally and externally
- Manage flexible, high-performing, and ease-of-use configuration and classification for product individualization
- Integrate and validate compliance requirements in the development process and manage product declarations as part of the product properties for all variants across the product supply chain and lifecycle
- Plan and communicate resource demand to match available resources in the long and short term
- Simplify decision-making and processes across the enterprise for manufacturing, service, and marketing through intuitive visualization
# Innovation and Project Control Deep-Dive

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<th>SAP S/4HANA Enhancements</th>
<th>Cloud/LoB Extension Enhancements</th>
<th>Planned Innovations and Future Directions</th>
<th>Business Benefits</th>
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| Inability to collect and select relevant consumer-focused ideas from across the enterprise | Ability to collect ideas across the enterprise. The impact analysis is run via a batch process                   | Innovation campaigns run in the enterprise; live expert collaboration with discovery in stage-gate approach (SAP Innovation Management solution) | All information in one place, enabling the right decisions for stage-gate-driven development projects with ability to look forward, backward, and across versions with embedded analytical insights and automation |                                                                                                   | • Increased revenue from new products   
• Increased new products meeting revenue/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. Planning, progress, roll-up, analysis, and simulation is done in batch runs | Live tracking of financial project KPIs by leveraging SAP HANA in-memory technology      |                                                                                                 |                                                                                                   |                                                                                                   |

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<tr>
<td>Delayed project milestones and missing delivery of required gate deliverables; inability to identify deviations until too late</td>
<td>Stage-gate-driven R&amp;D projects along with scheduling give project management operations transparent and accurate view of true project status</td>
<td>Simplified access for project members to confirm milestones and network activities using SAP Fiori apps</td>
<td>Bidirectional synchronization of project information with external scheduling tool (SAP Enterprise Project Connection application)</td>
<td>Role-specific SAP Fiori UIs for management of projects with multiple roles like program and project manager, project resource manager, project team members, with embedded analytics to enable insight to action</td>
<td>• Faster time to market • Increased portfolio and project management resource productivity</td>
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<tr>
<td>• Lack of transparency into project resource demands and allocation leads to project delays as well as low resource utilization</td>
<td>Capacity planning, detailed project role planning, and project staffing in a single application</td>
<td>Real-time access to resource availability, skill sets, and organizational assignment during project staffing process</td>
<td>• Cross-application, multi-resource staffing and scheduling availability • Accelerated access to project and task details through SAP HANA in-memory technology (SAP Portfolio and Project Management application for S/4HANA)</td>
<td>• Live planning, tracking, and monitoring of all deliverables as well as time and work-related aspects of projects • Seamless staffing and service procurement workflow with SAP SuccessFactors and SAP Fieldglass solutions</td>
<td>• Reduced R&amp;D expense • Increased portfolio and project management resource productivity</td>
</tr>
<tr>
<td>• Slow access to project and task details reduces productivity of project management resources</td>
<td>Work breakdown structure serves as basis for hierarchical project accounting; actual project cost visibility by using multiple applications</td>
<td>Change the status of a work breakdown structure (WBS) element through SAP Fiori apps; actual project costs visibility by using one integrated application</td>
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<td>Inability to plan project costs and budgets efficiently and track actual versus planned costs leads to budget overruns</td>
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<tr>
<td>Inability to report project costs and procurement data accurately increases risk of uncontrolled deviations and waste</td>
<td>Project financial and logistic information is sometimes inaccurate due to batch load process; drill down not possible</td>
<td>Direct and accurate access to project financial and logistic information; provides ability to drill down into details for project costs, resource usage, and progress</td>
<td></td>
<td></td>
<td>Reduced R&amp;D expense</td>
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<tr>
<td>Unsecured communication of project documents and product sustainability data via unencrypted e-mails and other communication channels</td>
<td>Secure project document exchange with partners, suppliers, and customers</td>
<td>Share and collaborate on project documents in a secure cloud environment accessible anywhere on any device (SAP Document Center solution)</td>
<td></td>
<td>Project network services integrating into design and supplier networks for collaborative project execution on content and deliverables with all involved parties both internally and externally in project execution</td>
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# Product Development Deep-Dive

## Typical Pain Points

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<tbody>
<tr>
<td>• Inability to bring consumer-driven product offerings to market in a timely manner leads to low brand equity and stagnant growth</td>
<td>• Searchable development history to increase reuse or decrease time and investment in development efforts that go nowhere</td>
<td>• Costs and other dimensions calculated 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)</td>
<td>• Project and design network services ensure all internal and external team members are leveraging a single digital backbone of product data</td>
<td>• Increased revenue from new products</td>
</tr>
<tr>
<td>• Inability to use existing knowledge or leverage external partnerships leads to inefficiency</td>
<td>• Ability to release engineering changes for a unique lot number and release date</td>
<td>• Increased profitability from executing engineering changes with full knowledge of downstream costs</td>
<td>• Enhanced context-sensitive analytics provide instant transparency on live data</td>
<td>• Reduced engineering change cost</td>
</tr>
<tr>
<td>• Inability to plan and manage engineering change leads to high downstream costs</td>
<td>• Product-related documents managed and linked to ERP master data throughout the end-to-end process</td>
<td>• Cloud-enabled document management and collaboration accessible anywhere on any device (SAP Document Center)</td>
<td>• Unified change management with sophisticated work flow across all aspects: mechanical, electronic, and software engineering</td>
<td>• Faster time to market</td>
</tr>
<tr>
<td>• Inability to identify reasons and/or reduce unsuccessful product initiatives</td>
<td>• Context-sensitive analytics</td>
<td></td>
<td></td>
<td>• Higher gross margin</td>
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<td>• Lack of complete, integrated view of cyber-physical products (complete view including smart product aspects)</td>
<td>Mechanical and electrical disciplines are integrated in end-to-end design process</td>
<td>Single and simplified multidiscipline product definition across the enterprise reduces development errors</td>
<td>Enhanced CAD integration based on the SAP Engineering Control Center integration tool with market-leading authoring tools to support cross-discipline product definition</td>
<td>End-to-end, 360-degree product view including requirements, mechanics, electronics, software components, simulation, etc.</td>
<td>• Faster time to market</td>
</tr>
<tr>
<td>• Tests and simulations are not leveraged in the early design phases</td>
<td></td>
<td>Simplified decision-making and processes for manufacturing, service, marketing, etc. through intuitive visualization (SAP 3D Visual Enterprise applications)</td>
<td>Project and design network services integrate into supplier and asset networks, bridging the gap between engineering, manufacturing, maintenance, and services</td>
<td>Live multi-level BOM explosion</td>
<td>• Reduced fines and recalls due to non-compliance</td>
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<tr>
<td>• Loss of information along the end-to-end process makes it challenging to enable seamless manufacturing and service</td>
<td>• Bill of material and routing management</td>
<td>• Visual handover to manufacturing supporting bill of materials (BOM), routing, and visual work instructions</td>
<td>Compatibility assurance between parts of the product, the product, and the ecosystem</td>
<td>• SAP Fiori app to maintain multiple BOMs in an intuitive, personalized, UI with enhanced analytics</td>
<td>• Reduced fines and recalls due to non-compliance</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Project and design network services integrate into supplier and asset networks, bridging the gap between engineering, manufacturing, maintenance, and services</td>
<td>• Requirements management integration enables bi-direction information flow for a clear development direction</td>
<td>• Reduced manual rework in manufacturing</td>
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<td></td>
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<td>• Reduced engineering change cost</td>
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### Typical Pain Points

**Current State with ERP on Traditional Database**

- Integration with the SAP Recipe Management application
- Ability to access the rules available in the ERP instance for selected markets and product categories

**SAP S/4HANA Enhancements**

- Accurate recipes for R&D, plant, and site by using different recipe types (with recipe development) leveraging SAP HANA in-memory technology for seamless end-to-end processes

**Cloud/LoB Extension Enhancements**

- Ability to create, view, and edit multiple recipes simultaneously
- Some key reports for margin control, such as finding percentage of pure substance in all recipes, can be run live

**Planned Innovations and Future Directions Business Benefits**

- Target-driven, streamlined recipe development to optimize compliance process
- State-of-the-art formulation tool to guide product creation and data maintenance
- Integration to cloud services to ensure compliance checks and declaration based on up-to-date data

**Product Development Deep-Dive**

- Reduced fines and recalls due to non-compliance
- Reduced scrap
- Increased gross margins

**Inaccurate recipes for R&D, plant, and site leads to a breakdown of enterprise processes: procurement, production, services, compliance, etc.**

**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**

**Inability to connect directly with suppliers and customers to receive and provide sustainability information of products**

**Product safety and stewardship solutions automates compliance determination and embeds compliance metrics in the R&D environment**

**Simplified, streamlined, and automated product compliance processes and embedded compliance in the R&D environment (SAP EHS Management: product and REACH compliance; SAP Product Stewardship Network: product compliance)**

**Compliance rules for all markets and categories in one place in an analytical environment to predict product compliance**

**Cloud services to streamline collaboration and share and report up-to-date compliance data**

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### Typical Pain Points

- Handling configuration models is complex and costly
- Support of configurations involving multi-discipline definition for individualized products is challenging, labor-intensive, and erroneous

### Current State with ERP on Traditional Database
- Variant configuration can be handled through the complete business process (engineering, sales and distribution, planning, etc.)

### SAP S/4HANA Enhancements
- SAP HANA-optimized low-level configuration in context of material requirements planning (MRP) simplifies variant management

### Cloud/LoB Extension Enhancements
- New high-performance configurator as the key enabler in engineering, manufacturing, sales, and beyond to manage “lot size one”
- Flexible SAP Fiori-based UI for configuration and classification
- Ability to create variant configuration models in a simplified way for supporting different levels for sales and manufacturing
- Integration of classification and configuration data in embedded analytics
- Leverage machine learning to provide better correction support for inconsistent configurations, leading to improved customer experience and smoother and faster order processing; the goal is touch-less (fully automated) processing

### Planned Innovations and Future Directions
- Seamless integration of the configure-price-quote process

### Business Benefits
- Increased revenue from new products
- Faster time to market

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**Product Development Deep-Dive**

- Increased revenue from new products
- Faster time to market

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**Increased revenue from new products**
- Faster time to market
SAP S/4HANA Research and Development Value Proposition

**Strategy Enablement**
- 10–20% reduction in effort and touches to define and release individualized and market-specific product variants
- New business models possible – “as-a-service,” etc.
- 10–30% faster design process for smart product offerings
- 10–55% faster time to market with robust product data management processes

**Risk Management**
- 10–40% improvement in accuracy of engineering changes
- 10–50% faster responses to customer inquiries
- 20–80% reduction in reporting time for compliance visibility of BOM and recipe across the lifecycle
- More compliant products on the market and reduction in fines and recalls
- Initiative visibility – one source of the truth from R&D to production

**Business Benefits**
- 10–20% increased revenue from new products
- 20–30% reduction in R&D expenses
- Increased product profitability
- 10–20% reduction of manual rework in manufacturing because of incorrect or incompatible product configuration
  - 15–20% more new products meeting revenue targets

**Employee Engagement**
- Development collaboration with internal and external partners
- Visual enablement across the enterprise leading to improved decision-making
- Improved accuracy of initiative book value and launch criteria
- Live planning, tracking, and monitoring of all deliverables and time-, cost-, and work-related aspects of projects
- Higher productivity and empowerment of R&D employees through role-based SAP Fiori apps
- 70–80% faster management of project tasks

* 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 + LoB and cloud capabilities. 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

**VOLVO**
Implementing a resource management process based on SAP HANA allowed Volvo 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. Research and development costs were reduced by 30% as well as reductions in project lead times.

[Click here for Volvo source reference.](#)

**VARIAN MEDICAL SYSTEMS**
Varian Medical systems, a leading manufacturer of medical devices, leverages the SAP Product Lifecycle Management (SAP PLM) application to plan, forecast, and execute its product development projects. It achieves a high degree of standardization and efficiency to support a globally distributed product development environment. With SAP PLM, it replaced outdated 2D models with 3D models and visual work instructions that provide a higher level of visual accuracy, understanding, and user engagement for product and product support engineers. Faster preparation (70% faster, from one week to two days), delivery, and consumption of detailed training material occurred when moving from paper-based manuals to interactive 3D deliverables.

[Click here for Varian Medical Systems source reference.](#)

As customers are at various stages of realizing the value of S/4HANA, additional stories will become available in subsequent updates to this white paper.