Digital Manufacturing

Powering

the Fourth Industrial Revolution



GEORG'S POINT OF VIEW



Industrial machinery and component companies are the powerhouse behind the fourth industrial revolution, with intelligent and connected machinery and equipment for companies across all industries.

Georg KubeGlobal Vice President Industrial Machinery and Components SAP SE

Dear Customers,

The digitalization of business across all industries is happening rapidly, and there is no turning back. Companies are looking for new ways to deliver value to their customers using digital channels and creating personalized, digitally enabled products across all sectors, from consumer products to heavy equipment and machinery.

The industrial machinery and components (IM&C) industry is at the heart of this shift, providing the intelligent machines and equipment needed for this transformation as well as spearheading innovative processes like connected manufacturing and predictive maintenance and service.

So the value of digitalization for IM&C companies lies in two areas:

- Top-line growth through better solutions that are digitally enabled and more differentiated
- Bottom-line cost savings through more efficient and effective digitally enabled processes

But the market is not uncontested, and as new entrants are breaking into traditional manufacturing domains, established manufacturers are moving their focus from delivering pure products to providing end-to-end solution lifecycle services. IM&C companies need to redefine their core competencies and consequently to rebuild their business strategies around those competencies. In working with leading companies across the globe, we see investments and energy around five strategic priorities:

- Customer centricity
- Serving the "segment of one"
- Digital smart products
- Digital supply chain and smart factory

· Servitization and new business models

Our goal is to help the IM&C industry successfully master the digital transformation and become a driver for the digitalization of companies across all industries.

SAP has the vision, the solutions, and the commitment to go with you all the way from defining your digital strategy to and delivering the right solutions to running your digital backbone in the cloud.

This document offers our perspective on where the industry will go and how SAP contributes to the evolution of the manufacturing industry in a digital world.

Run live!

Georg Kube Global Vice President Industrial Machinery and Components SAP SE

TABLE OF CONTENTS _

The Digital Economy	4
The Big Picture	4
The Future	5
Reimagining	6
Reimagining Business Models	7
Reimagining Products	8
Reimagining Business Processes	9
Reimagining Work	10
SAP Digital Transformation Framework	11
Five Pillars	12
Portfolio for SAP Digital Transformation Framework	13
SAP's Digital Platform Enables Critical Business Capabilities	14
How Does It All Come Together?	16
From Your Current State to Digital	17
Transforming From Your Current State To Digital	18
SAP Digital Business Services	19
SAP Comprehensive Ecosystem	20

Why SAP?	21
----------	----

Appendix

23



THE DIGITAL ECONOMY -

Big picture: IM&C companies are powering the fourth industrial revolution

Technology trends change everything

Digitalization has reached every aspect of today's life, and it is here to stay. For the industrial machinery and components (IM&C) industry, technologies like:

- Internet of Things
 Artificial Intelligence (Machine
- Artificial Intelligence/Machine LearningAugmented Reality
- Augmenteu Reality

provide new and exciting opportunities. But at the same time, they open the playing field for companies that are not traditional manufacturers, but come with expertise in these technologies from other industries.

Providers and users of digitally enabled products

In a recent study, Cisco estimated that the Internet of Things will create US\$14.4 trillion of value by year 2020.¹ But what does that mean for IM&C companies specifically?

In order to answer that question, we need to take a look at the special role that manufacturers of equipment and machinery play in the digitalization of businesses across industries:



First, they provide the digitally enabled machinery and equipment so that other companies can innovate their business.

And second, they are spearheading innovative processes themselves, leveraging the digital capabilities of the equipment they use.

So in essence, the opportunity for IM&C companies lies in two areas:

- Top-line revenue growth through better and more differentiated products
- Bottom-line cost savings through more efficient and effective processes

IM&C companies need to redefine their core competencies and rebuild their business strategies around them. Successfully embracing the opportunities from new technologies and consequently implementing the right business initiatives will be the foundation of successful digitalization and staying ahead of the innovation curve.

Access more information on the latest technology trends here:





Digital business models are disruptive. The rules have changed.

- Kaeser Kompressoren, a leading global provider of compressed air systems and services, is reimagining customer service by capturing over a million machine measurements a day in the field.²
- STILL, a top supplier of forklift trucks, platform trucks, and logistics systems, is prototyping the cubeXX, a driverless vehicle equipped with the latest sensor and scanning technology that connects to STILL's customers' ERP and warehouse management systems, enabling new business models like logistics operations and transport as a service.³
- IFM, an innovative automation technology company, is seamlessly and cost-effectively connecting sensor technology with SAP* solutions for the Internet of Things (IoT) to truly become the eyes and ears of industrial machinery and equipment around the world.⁴
- Siemens is a global electrification, automation, and digitalization powerhouse that is connecting industrial assets to the cloud so customers can proactively monitor and optimize their processes and generate new revenue streams by selling services instead of products.⁵
- Vestas, the only global energy company dedicated exclusively to wind energy, is combining power capacity and quality control through IoT-based real-time interoperability.⁶

THE DIGITAL ECONOMY -

The Future: Priorities for Industrial Manufacturers

Strategic Priorities for IM&C Companies

In this situation, where the opportunity is huge but at the same time new market entrants are threatening traditional IM&C companies, it is essential to focus on the right strategic priorities to drive digitalization across the business.



1. Customer centricity

Putting the end customers' point of view at the center of every decision is a key prerequisite for success in the digital age. This does not stop in the sales department but also applies to what products are built and what services are offered.



2. Serving the "segment of one"

Providing solutions that precisely fit the needs of one single customer has been commonplace in traditional engineer-to-order environments. Now, the ability to capture customer requirements effectively and drive mass customization is the key to giving customers exactly what they want.



3. Digital smart products

Differentiation and specificity in products stems from digital capabilities and value-added services that are bundled with the physical products. Using digital capabilities like self-awareness of technical health and operational status or business system connectivity helps industrial manufacturers differentiate.



4. Digital supply chain and smart factory

Digital technology on the shop floor and in the supply chain is not new. What is new is the way production and logistics are intelligently connected to the rest of the business and are able to deal with external impulses like short-term demand and supply fluctuations or changes in the configuration of a customer order that require different materials, parts, and machining operations.



5. Servitization and new business models

As traditional products are commoditized, IM&C companies are shifting from selling physical products to providing complete solutions. Generating more than 50% of revenue from services is a common goal for manufacturers who are looking for higher profit margins and increased customer intimacy. The **"digital twin for business"** is a key requirement, representing the physical product over the entire lifecycle, including changing data points during manufacturing and installation as well as operational performance issues, financial value created, and costs incurred up until the final phase of decommissioning.

Successfully embracing the opportunities from new technologies and consequently addressing these five strategic priorities will be the foundation of successful digitalization and staying ahead of the innovation curve.

REIMAGINING

But how do you achieve these strategic priorities? The starting point of the digital journey is the ability to reimagine your business together with customers. That means reimagining your business models, your products, your business processes, and your work. The potential is huge:

10%

of the data in the digital universe will be coming from embedded systems by 2020⁷

\$6.2 trillion

is the estimated global worth of Internet of Things technology by 2025⁸

\$1 trillion is the estimated size of the machine-to-machine (M2M) market by 2020⁹

33%

of industrial companies are already using or developing IoT projects, and another 25% are actively evaluating IoT projects¹⁰

REIMAGINING

THE DIGITAL ECONOMY OFFERS INFINITE OPPORTUNITIES

In a connected world where every company is becoming a technology company, smarter products and services will refocus commerce on business outcomes and blur industry lines.



REIMAGINE BUSINESS MODELS

In the industrial machinery and components industry, the next evolution of business models is being driven by digitally connected equipment combined with business data and third-party information to provide new service models, such as equipment as a service, value-added software applications, and digital orchestration of the entire value network for selling customer-specific solutions.

Customer Centricity

IM&C companies may find opportunities to enhance customer relationships through the servitization of smart digital products while jointly sharing risks and maintaining profitability. There is great opportunity in extending business models by moving from selling products (CAPEX) to selling performance (OPEX), invoicing customers based on actual consumption.

- Software solutions can be developed and sold in an application service marketplace.
- Information, such as machine data, can be resold in digital networks as OEMs become "data brokers."
- Machine information can be leveraged to enable smart manufacturing, service, and logistics networks.

Solution provider networks

Specialization of customer requirements will continue to grow, impacting every aspect of the industrial value chain. IM&C companies have always delivered unique, configured-to-order (CTO) or engineered-to-order (ETO) solutions. Now, these companies are challenged to extend these capabilities into areas where CTO and ETO are not cost-effective models.

- New revenue streams can be unlocked by offering specialized and profitable products.
- Modular product concepts combined with digital capabilities effectively execute processes from initial engineering through aftersales service.
- Customer-facing digital capabilities can be leveraged across product information, operational processes, and highly customized and configured end products.

Digital supply chain and smart factory

Manufacturing and supply chain process will be organized differently with intelligent interaction between products, machines, processes, and people. Information transparency along with local intelligence for decentralized decision making will prepare IM&C companies to capitalize on new opportunities.

- Cost structures can be fundamentally transformed to serve segments that were not previously addressable new markets or under-served segments within current markets.
- Customized configurations can be delivered in a scalable way thus increasing customer intimacy and profit margins.
- IM&C companies can become part of their customers' processes and sources of further value-added services.

Servitization and new business models

IM&C companies may find opportunities to enhance customer relationships through the servitization of smart digital products while jointly sharing risks and maintaining profitability. There is great opportunity in moving from selling products (CAPEX) to selling performance (OPEX) and consumption based models. New business models are also emerging to provide complete solution bundles rather than a basket of individual products.

- Customer billing is triggered when the output is actually consumed.
- Aftermarket service strategies become an integral part of service-level agreements.
- Business partners are included in the solution delivery process through digital collaboration platforms.



SIEMENS INDUSTRY CLOUD

Siemens is offering Siemens is offering cloudbased services to manage industrial equipment bought from Siemens as a way to enable usagebased billing.¹⁰



KAESER SIGMA AIR UTILITY Kaeser Compressors offers compressed air also as a utility rather than selling the compressor.¹¹



REIMAGINE PRODUCTS

Industrial machinery and components companies' products are typically a key differentiator in the marketplace and the foundation of how these companies build their business and their customers' businesses. We expect that IM&C companies will expand and redefine their business models by adding digital services to their currently mechanical-predominant products.

Digital Smart Products

Differentiation and specificity in products stems from digital capabilities and value-added services that are bundled with the physical products. Three characteristics differentiate these products:

Intelligent and self-aware

Adding sensors, computing, and communication to your products allows them to become aware of their status and solve problems autonomously.

- Smart digital products will integrate, monitor, and process real-time sensor, geospatial, business, and environmental data, such as weather information, to define their current and future status.
- Digital object memories will permanently persist every single event that ever happened to a certain product, such as a firmware update or maintenance activity.
- Predictive analytics is a key enabler to leverage the data that is continually generated by these intelligent and self-aware assets

Connected among themselves and to the Internet of Things

Cutting-edge products will collaborate to get their jobs done efficiently and with high reliability.

- Self-aware products will collaborate with each other to run more efficiently. For example, if a breakdown is predicted, the product would trigger automatic load balancing to prevent an outage.
- The current and future status of products will be shared with multiple business partners for collaborative inter- and intracompany processing of service bulletins and managing spare parts to foster servitization and manage end-to-end solution lifecycles through digital twins for business.
- Top performers in the industry will provide open platforms to share information coming from their installed products to offer benchmarking services for performance improvement across company borders or establish marketplaces to sell and source capacity utilization from others.

Mass customization with features, options, and performance on demand

Digitalized products provide exactly what your customers need, when they need it, and in a profitable way.

- The "segment of one" will be realized not only by adapting the physical properties of a product but also by digitally setting parameters comparable to a license key for a software application.
- Industrial customers will be able to upgrade or downgrade the capabilities of the machinery, equipment, and components via various channels, adapting the licensing of the physical object as required.



STILL CubeXX – Not just a forklift

The CubeXX concept sets a new standard in intralogistics material handling. It not only provides a number of physical innovations to let the vehicle transform itself for various transport situations; it also has a full digital platform on board that allows it to:

- Move autonomously on factory and warehouse floors
- · Connect to the ERP and warehouse management system to execute transport orders autonomously
- Connect between a number of transport vehicles and execute transport orders as a fleet negotiating the best vehicle to actually perform the task
- Remotely track and monitor all vehicles in the transport fleet12



NEXT GENERATION PRODUCTS

Thirty-one percent of respondents to a Forrester research survey answered that they were looking to create products that have never existed before.¹³



NEW GENERATION

Leading companies are introducing a new executive role into their organizations: The chief digital officer (CDO) is responsible for driving digitalization into every aspect of a company – first and foremost its products.¹⁴



In the digitalized world, business processes must go beyond internal and external boundaries. New digitally enabled product characteristics that are sold through new business models require companies to reimagine the fundamental processes across all lines of business.

R&D/ENGINEERING: Collaborative design

Traditional product development is focused too often on the product itself. In a digitalized world, collaborative engineering processes that merge mechanical, electrical, and software developments inside organizations and with external engineering partners are key. Further, product design processes that leverage the digital capabilities such as the IoT need to be developed in close cooperation with the design of new business models in sales and service.

Digitalization of business is not only already a reality – digital technologies are also evolving at a speed like never before. Business processes in research must be focused on adopting new technologies to support the existing digitalized business models and also to allow new business models to be created. For example, 3D printing is on the rise, and those companies turning the new opportunities into faster time to market will differentiate themselves in the market.

MARKETING: Contextual customer engagement

Through digitalization across the industries, IM&C companies face an acceleration in the trend from selling discrete products to selling end-to-end solutions with a live-time performance promise to their customers. Sales processes must be redesigned, considering the increased expectations of the customers and also to sell bundled products, software, services, and technologies. This is often a new way of engaging, not only with customers and partners but also as an extended collaboration between the manufacturer and its key suppliers and service or go-to-market partners.

Tennant Company Leverages the Internet of Things to Help Customers Drive Measurable Results and Reduce Cost to Clean"Tennant Company, a "Tennant Company, a world leader in designing, manufacturing, and marketing solutions that help create a cleaner, safer, healthier world, introduces IRIS* Asset Manager, an intelligent command center that provides daily, actionable data from machine to human.... Remote visibility to machine performance, equipment usage, and machine location helps customers tackle some of their biggest challenges such as reducing costs, improving cleaning



efficiency, and enhancing machine and employee productivity."15

SALES: Solution selling and usage-based billing

More than ever, manufacturers have insight and influence into the operation of their products. New revenue models that use digital capabilities such as the IoT allow their customers to consume products as a service rather than buying the product. Business processes in this area go beyond the point of sale to expand into a lifetime relationship where performance consumption is measured and subsequently billed to customers.

MANUFACTURING AND SUPPLY CHAIN: Smart factories and logistics

Digital technology on the shop floor and in the supply chain intelligently connects manufacturing operations and supply chain networks to the rest of the enterprise, while new technologies like 3D printing and augmented reality can help dramatically modernize the production of smart digital products.

AFTERMARKET SERVICE: Predictive maintenance and service

In a digitalized business, the sale of a product is just the beginning, and it may deliver no profit at that time. The aftermarket in industrial products could become the profit maker. While in traditional sales models, the aftermarket is seen as "nice to have" business, new business processes that leverage digital innovations and that are integrated across the lines of business and involve external solution providers and technology partners are necessary for actually bringing in profit.

Manufacturers that reimagine their business in a digitalized world will see their profit come or go in the aftermarket. Any inefficiency in the aftermarket processes, product performance issues, or failures will eat up their margin. Leveraging M2M technologies along with Big Data scenarios allows IM&C companies to secure their business, such as through predictive maintenance and service or emerging issue detection.





To remain successful in the digital economy, companies must reimagine their business models and processes. Industrial manufacturers require an adaptive workforce with new skills in order to adjust to the profound changes in how we work, learn, and interact.

Most substantial business transformations automate manual tasks, enrich jobs, and create new types of work.

Ad hoc collaboration and learning bring together the right people at the right time, independent of organizational boundaries, to learn and perform a task in the most timely, efficient, and effective manner.

Transparency and access to data are key for empowering the digital workforce and enabling industrial professionals to tackle problems with confidence while taking their organizations to even higher levels of innovation and excellence.

Mobile and distributed workers require applications that are simple and scalable across different platforms, ensuring that the right information is easily and quickly accessible, at the right time, and on the right device.

Robot interactions/"lights out" factories will further change the role of the worker into more of an orchestrator and exception manager, who only engages when the digital factory requires human creativity and ingenuity. Flexible business-to-people relationships in the industrial machinery and components industry are integral to the digitalization of business processes, providing connected machinery and equipment while steering innovations such as predictive maintenance and service. The transformation to the digitalized world creates new and different interactions for the workforce – with other individuals as well as with machines. Real-time digital information on the right devices is critical for the workforce of the future to be successful.



"Blount International is a global manufacturer of replacement parts, equipment, and accessories for forestry, lawn, agriculture, and other equipment. It counts on cloud-based SAP SuccessFactors extensions for things like performance, succession and goal management, and to house employee bios and profiles, which it says has given greater visibility into who employees are and what they do, in one comprehensive location."¹⁷

"Our culture needed to change to become more agile and flexible. And we needed a modern leadership style so that the organization could spend more time creating a more-attractive workplace." **Mikael Landberg, Senior Vice President of HR, DeLaval**¹⁸



of employees say it is very important to work for a digitally enabled company or digital leader¹⁹

SAP DIGITAL TRANSFORMATION FRAMEWORK

A SIMPLE AND PROVEN APPROACH TO VALUE CREATION THROUGH DIGITALIZATION

Every company across all industries requires a simple digital approach to build a pragmatic and executable vision of its digital strategy.

SAP DIGITAL TRANSFORMATION FRAMEWORK

Every company needs to think about the five pillars of a digital strategy

We have looked at the five strategic priorities that IM&C companies are pursuing and how they have to reimagine their businesess models, products, processes, and work to do that.

Let's now look at how SAP can help enable them do this by providing the following architecture.

As companies are reimagining their entire business, they need an IT architecture that provides both stability and long-term reliability for the core enterprise processes, and at the same time allows for flexibility in areas where change is happening on a constant basis.

This concept, which is often referred to as "bimodal IT," is brought to life through the SAP Digital Transformation Framework methodology, pictured below.

- 1. The digital core is the foundation for the core enterprise processes, which need to run consistently and uninterrupted. It provides real-time transactions and analytics, the ability to work with Big Data, and connectivity to the four outside pillars of the framework.
- 2. IoT and Assets connect both digital products you are providing to your customers and assets and machinery on your factory floor to the digital core. A large amount of flexibility is needed to connect new equipment on a constant basis.
- 3. Your **customers** require flexibility in the way they interact with you through multiple channels.
- 4. Flexibility and adaptability in working with **business networks** are key in order to onboard new suppliers quickly and shift supply to alternates.
- 5. And finally, a lot of flexibility is required when building and maintaining an agile **workforce**.



SAP PORTFOLIO WITH SAP S/4HANA AND SAP LEONARDO

SAP has innovated its portfolio to provide both for a stable digital core as well as flexible line-of-business (LoB) extensions.

In the digital economy, simplification and business innovation matter more than ever. To do this effectively, it's important to cover the end-to-end digital transformation journey, ranging from planning a digital innovation road map and implementation plan with proven best practices to the ability to run all deployment options and ultimately optimize for continuous innovation with a focus on outcomes. Processes are designed from the outset to flow end to end across the cloud based solution extensions, listed in the white bands, and are fully integrated to S/4HANA Enterprise Management and are optionally deployed to address business needs. The solution capabilities in the dark blue band, the digital core, are delivered as part of S/4HANA Enterprise Management. The lighter blue band, also in the digital core, are part of S/4HANA Enterprise Management, but added on as needed.





Digital core: Core solution capabilities delivered as part of SAP S/4HANA Enterprise Management Digital Core: Solution capabilities that are also part of SAP S/4HANA Enterprise Management, but added/purchased as needed. Extensions: Cloud-based (LoB) solution extensions that are *fully integrated* with SAP S/4HANA Enterprise Management. but added/purchased as needed. Leonardo: Solution capabilities that are powered by a Leonardo technology and included in the Leonardo suite and how to add/purchase is not shown on this diagram.

Learn more about SAP's solutions today and discover planned innovations by accessing SAP's road map for IM&C here:



They pursue five key initiatives which require	In 1. They provide the c can innovate their	dustrial Machinery digitally enabled machinery business - driving topline	& Components comp and equipment so that othe revenue	panies play a key role in the er companies	digitalization of businesses 2. They are spearheading in the equipment they use -	across all industries: novative processes thems achieving bottom line co	elves leveraging digital cap <mark>st savings</mark>	babilities of
capabilities along the value chain	R&D	Sales & Marketing	Supply Chain	Manufacturing	Aftermarket Service	Procurement	Finance	Human Resources
Customer centricity	Co-innovate with customers Deliver product innovations resulting from actual equipment use and incident reports Collect structured requirement based on interactions with customers and design partners	 Contextualize customer engagement Engage omnichannel solution selling Organize and empower sales teams 	 Foster demand-driven, collaborative supply networks Enable on-time delivery and advanced availability-to-promise capabilities 	 Adjust production orders with greater flexibility based on customer priorities Foster an agile and responsive manufacturing network Track and trace individual products 	Organize and empower teams Flow customer information across channels Personalize end-to-end service parts processes Access a service knowledge database	 Find and contract talent with specific noncore skills Drive new strategies outside the current business scope Derive insights to enhance situational awareness and speed-to-decision 	 Use simulation and analysis to evaluate financial implications of strategic business choices Manage the customer portfolio strategically 	Maintain a pipeline of top talent Attract and secure top talent Work with customers through flexible contracting Enable social collaboration among teams
Serving the "Segment of One"	Modularize product concepts and well- structured product families Use platform models across product families Select engineer-to-order capabilities during the sales configuration process	 Personalize marketing and sales Segment customers with sophistication Configure products and manage variants such as costing 	 Plan sales and operations with flexibility Support responsive material requirement planning Promote efficient and flexible internal and external logistics and supplier collaboration 	 Produce for a lot size of one with high asset utilization and optimal set-up times Integrate seamlessly sales orders with specific parameters with the shop floor Give electronic work instructions 	Offer tailor-made services Deliver an equipment-specific service portfolio Gain full transparency into equipment lifecycle information Provide an easy buying of services and parts	 Enable economies of scale and flexible call orders with strategic and agile global supplier-network management Onboard alternative suppliers with flexibility 	 Analyze profitability instantly across multiple dimensions such as product groups, customers, projects, profit centers, and plants 	 Identify, forecast, and address skill gaps Onboard and train employees quickly and seamlessly
Digital smart products	Adopt a systems engineering approach that includes mechanical, software, and electronic capabilities Embed the technology foundation for equipment networks Manage digital IP effectively	Enable collaborative solution and value selling Generate leads through predictive product replacement and precise segmentation Sell Software	 Track digital components Actualize efficient replenishment strategies Enable 3D printing for spare parts Use digital twin throughout entire supply chain 	 Install and manage in-product software Support advanced testing and connectivity management 	Provide services for digital smart products Enable a feedback loop in internal business processes Connect digital products in the field with an equipment network	Execute procurement strategies for 3D- printed service parts Bundle third-party service with products Identify and contract suppliers closely connected with Product Design and Engineering	Include payment models for digital services in product calculations and financial reporting Manage and help ensure digital rights compliance	Train and certify workforce on new digital technologies Work with universities and external entities in a flexible manner Engage in knowledge sharing and community building
Digital supply chain & smart factory	Integrate manufacturing engineering with electronic and manual management of bills of materials Visualize manufacturing processes digitally based on harmonized product data	 Forecast sales precisely and reliably Align supply chain and sales planning Route customer orders directly into the factory as production orders 	Achieve real-time end-to-end visibility into supply chain management Plan demand and supply flexibly Integrate material management –from shop floor to warehouse	 Integrate vertically up to the customer Support machine-to-machine integration Innovate plug-and-produce processes Benefit from a digital twin of the manufacturing facility 	Collaborate on equipment data through a network Handover as-built equipment information seamlessly to aftermarket services Produce service parts by 3Dprinting	Allow contractual enablement of global supply chains with multi-tier suppliers management Automate and simplify the integration of material suppliers	 Optimize working capital Manage increased financial risks associated with highly flexible supply chains and manufacturing operations 	Empower employees to make decisions in real-time Manage external contractors with greater flexibility Enable agile work teams
Servitization & new business models	Calculate actual equipment use Offer digital services with data platforms Support equipment information sharing along the value chain	Support omnichannel solution selling Sell data and digital services Manage contract value Charge based on performance Enable customer self-service	 Collaborate with customers and suppliers Improve demand sensing and automate replenishment Optimize service parts planning and logistics performance 	 Deliver on the highest quality requirements Avail manufacturing parameters to service processes Distribute product-use information for production planning 	Deliver performance-based services and products as a service Monitor remote conditions and performance of installed base Provide predictive services Innovate digital value-add services	Augment the workforce by integrating contingent workers efficiently Deliver the highest quality in the shortest time through service-parts collaboration	 Finance and manage the risk of assets that are operated for customers through a product-as-a-service contract Allow financial controlling of performance- based service contracts 	 Procure and manage contingent labor and services for an optimized service delivery across regions
Typical business benefits*	New products revenue: + 10-20% R&D cost: - 20-30% Revenue targets met by production: + 15- 20%	On-time delivery: + 10-20% Inventory levels: - 25-30% Customer satisfaction: + 10-20%	Cost due to stock-outs: - 20-25% Days in inventory: - 10-12% Total logistics cost: - 10-12%	Total manufacturing cost: - 10% Manufacturing cycle time: - 10% Scrap value: - 25%	Revenue leakage: - 7-9% Service delivery cost: - 4-5% Cost of noncompliance: - 4-5%	Procurement function cost: - 15-20% Worker acquisition time: - 30-40% Days payable outstanding on targeted spend: - 2-5 days	Days to close annual books: - 40-50 Budgeting & forecasting cost: - 25-50% Audit cost: - 20-40%	Lower time and attendance function cost HR full-time equivalents: -44%
Digital Innovation	్లో Internet of Thi	ngs	Machine Learning		nalytics	্য Blockchain		🚔 Big Data
SAP Leonardo	SAP Cloud Platform	Analytics Services	UX Serv	vices	Mobile Services	Security Service	s Col	laboration Services
mpany. Al t	Product lifecycle costing	Brand impact	Global track and trace Vehicle insights	Plant connectivity Distributed manufacturing	Asset intelligence network Predictive maintenance and service Service ticketing		Digital boardroom Accounts payable	Resume matching Job matching Job standardization
So entropy of the second secon	Engineering control center Visual enterprise Constraint management Innovation management Cloud for product stewardship	Price and margin management Heavy equipment management Social collaboration SAP Hybris (*) Sales Configure, price and Marketing quote Commerce Billing	Integrated business planning Response and supply orchestration Supplier network collaboration Collaborative supply chain Service parts planning Transportation management	Manufacturing execution Manufacturing integration and intelligence Visual manufacturing planner Product structure synchronization	SAP Hybris (*) • Service • Commerce • Billing	SAP Ariba A Spend Visibility Collaborative Supply Chain Procure-to-Pay Collaborative Commerce Collaborative Finance SAP Fieldglass C CONCUR	Business process consolidation Shared services framework SAP Ariba	SAP SuccessFactors 🖓 • Core human resources and payroll • Talent management • Time and attendance management • Human capital analytics SAP Fieldglass 👯 💽 CONCUR
Pigital Coro	Enterprise portfolio and project management Commercial project management Compliant product lifecycle management	Sales planning and performance management Billing and revenue innovation management	Extended warehouse management Advanced order promising and ATP Constrain-based production planning Production scheduling				Financial planning and analysis Accounting and financial close Treasury management Receivables management Invoice mont, and accounts pavable	
SAP S/4HANA	Product development and project control Production engineering Variant configuration Embedded software management	Order and contract management Sales order fulfillment cockpit User experience and interface solutions Settlement management Integration with SAP Hybris solutions	Inventory and basic warehouse management Production planning Real-time inventory management Multilevel goods receipt	Production orchestration and execution Enhanced material requirements planning Quality management	Service management Service master data management Service parts management Service agreement management	Operational purchasing Collaborative sourcing and contract mgmt.; Invoice and payables mgmt. Suppler management Procurement analytics	Accounting and closing operations Accounting Cost management Profitability analysis	Time recording

*) Benefits are based on early adopters of SAP S/4HANA, or conservative outside-in benefits due to moving from a traditional ERP to SAP S/4HANA, SAP Leonardo and other relevant SAP solutions.

HOW DOES IT ALL COME TOGETHER? PREDICTIVE SERVICE EXAMPLE

As an example, industrial manufacturers that transform themselves and bring all these elements together will be able to benefit from digitalization and capture new top-line revenue as well as bottom-line savings by running sophisticated scenarios.

Imagine you are working for a company producing industrial robots. Your products are deployed at customer sites around the globe, and you are in charge of global maintenance and support. If you had access to an architecture like the one described before, you would be able to work much more effectively, and your day could look like this:



- 1. You could start by taking a look at your complete fleet of robots installed across the globe. And you would immediately see if and where there is a problem.
- 2. Drilling deeper into identified issues gives you first information on the affected asset and its location.
- 3. Connecting to the asset through the IoT services of SAP HANA[®] Cloud Platform allows you to see operational parameters in real time and identify data streams exceeding thresholds.
- 4. Mapping the data streams from different sensors to the asset master data and visualizing in SAP 3D Visual Enterprise applications give you a clear understanding of where the problem is.
- 5. Using the prediction engine in SAP HANA allows you to determine the probable time to failure.
- 6. You can check easily if the spare part is available in stock or in the supply chain.
- 7. You can check if a service technician with the right skills is available until the estimated time to failure.
- 8. If no qualified technician is available in-house, you can even check if a service technician with the right skills is available at a service partner until the estimated time to failure.
- 9. You can directly create a service order with the required work instructions, spare parts, and worker skill set.
- 10. Once the service order has been created, the installed base overview shows the problem to be work in progress.

With a scenario like this, you are able to :

- · Minimize equipment downtime for your customers
- Increase your service level
- Ultimately create more profit and additional revenue from your service operations



Watch a video illustrating the scenario here



FROM YOUR CURRENT STATE TO DIGITAL

THE JOURNEY TO BECOMING A DIGITAL MANUFACTURER BEGINS WITH PLANNING A DIGITAL TRANSFORMATION ROAD MAP

TRANSFORMING FROM YOUR CURRENT STATE TO DIGITAL

The keys to success

In the digital economy, simplification and business innovation matter more than ever. To do this effectively, it's important to cover the end-to-end digital transformation journey, ranging from planning a digital innovation road map and implementation plan with proven best practices to the ability to run all deployment options and ultimately optimize for continuous innovation with a focus on outcomes.



And to move forward with speed and agility, it helps to focus on live digital data, instead of Big Data, and combine solution knowhow and industry-specific process expertise with data analytics so that the right digital reference architecture is defined and delivered. In that context, we believe that a model company approach is very relevant to enable you to transition from your current state to digital. Model companies represent the ideal form of standardization for a specific line of business or industry. They are built on existing SAP solutions using best-practice content, rapid prototyping solution packages, and additional content from customer projects. They provide a comprehensive baseline for rapid, customer-specific prototypes, cloud demos, and quick-start implementations.





SAP DIGITAL BUSINESS SERVICES

Enabling your success in digital transformation

SAP has a broad range of services to cover the end-toend digital transformation journey, ranging from advising on a digital innovation road map and implementation plan with proven best practices to the ability to run all deployment options and ultimately optimize for continuous innovation. We provide both choice and value within our service offerings, allowing you to tailor the proper approach based on your specific company expectations and industry requirements.

- 25,000 professionals in 70 countries
- Serving customers in 130 countries
- Outcomes delivered as one team in one contract
- Projects connected in real time to global network of support functions through SAP Mission Control Center
- SAP MaxAttention[™] and SAP ActiveEmbedded services to safeguard investment
- Consistent experience on premise, cloud, or hybrid
- · Standardized adoption of processes and tools
- · Streamlined onboarding and ramp-up of stakeholders

From proposing a comprehensive digitalization proposal to realizing and running it, SAP delivers on the digital transformation promise to its customers, on time, on budget, and on value.

SAP value delivery relies on unique differentiating assets:



SAP Digital Business Services deliver digital innovation with simplification and accelerated implementation, which is key to adoption and value realization. Continuous improvement is supported through ongoing assessment of real-life data insights and joint governance with customers.

SAP value delivery focuses on the following deliverables:

Digital Business Foundation

	Re-imagine	Design	Transform	
Business	Digital	Business Model	Business Model	
Innovation	Dream Zone	Design	Implementation	
Digital Architecture	Digital Strategy	Enterprise Architecture & Roadmap	Business Transformation	
Value	Value	Value	Value	
Generation	Proposition	Design	Governance	

- Digital business model
- Flexible, scalable enterprise architecture
- Platform for the digital future
- People and culture transformation

Business Insights



- Digital boardroom
- Predictive customer insights
- Value realization dashboard
- Agile decision making and execution support

Continuous Improvement



- Joint value governance
- Sustainable engagement model
- Innovation without disruption
- Simplification

SAP COMPREHENSIVE ECOSYSTEM

Orchestrating the world to deliver faster value

Our comprehensive ecosystem for the IM&C industry offers:

- Integration into a wide range of business services (suppliers, banks, key vendors, travel, and more)
- Open architecture, with a choice of hardware and software
- · Complementary and innovative third-party solutions
- Reach partners to serve your business of any size anywhere in the world
- A forum for influence and knowledge
- A large pool of industry experts with broad and deep skill sets



BUSINESS NETWORK

- 1.9 million suppliers
- 200 major travel partners (air, hotel, car)
- 50K service and contingent labor providers

INFLUENCE FORUMS & EDUCATION 32 user groups across all regions 40+ industry councils SAP community with >24 million unique visitors per year 1,800 members of SAP University Alliances

INNOVATION

- 1,900+ OEM solution partners to extend SAP solutions
- 2,000 startups developing SAP HANA apps



- 860+ IM&C channel partners
- 4,800 overall channel partners

IMPLEMENTATION SERVICES

- 300+ services partners focused on IM&C
- 3,200 services partners overall
- Delivering IM&C-specific solutions
 and services

PLATFORM & INFRASTRUCTURE

- 1,400 cloud partners overall
- 30+ IM&C platform partners

WHY SAP?

SAP has the vision, the solutions, and the commitment to go with you all the way, from defining your digital strategy to delivering the right solutions to running your digital backbone in the cloud.

SAP IS COMMITTED TO INNOVATION

Vision	Help the world run better and improve people's lives
Mission	Help our customers run at their best
Strategy	Become the cloud company powered by SAP HANA



MASTERING INTEGRATION AND UNLOCKING BIG DATA

Carl ZEISS Vision International GmbH reduced TCO by **50%**, handled **400,000** messages per day, and implemented more than **700** integration scenarios.²⁰

WORLD-CLASS, ON-TIME DELIVERY PERFORMANCE

Nortec Global HVAC, formerly known as Nordyne, reduced its MRP run **from six hours down to 22 minutes** to become even more responsive when balancing supply and demand.²¹

LEANER STRUCTURES FOR FASTER BUSINESS PROCESSES

STIHL generates reports and analyses **11x faster** with a **4x reduction** in database size through compression and **40% faster** processing times after migration to the SAP HANA platform.²²

RESOURCES

Outlined below is external research that was used as supporting material for this white paper.

1. "Embracing the Internet of Everything to Capture Your Share of \$14.4 Trillion," Cisco white paper, 2013

www.cisco.com/web/ciscocapital/apjc/ass ets/pdfs/loE_Economy.pdf

- 2. Customer Testimonial: SAP HANA at Kaeser Kompressoren, September 16, 2014 www.youtube.com/watch?v=9oyInxA5vQ8
- 3. STILL Turns Vision into Reality with SAP HANA Cloud Platform, April 23, 2015 www.youtube.com/watch?v=xJ-1psHSTbl
- IFM Unites the World of Sensors and Machine Data with Business Processes. August 19, 2014 www.youtube.com/watch?v=X4026L4ft0U
- Siemens Creates an Open Cloud for Industrial Customers Based on SAP HANA, July 9, 2015
 Name you tube com (watch?v=vid, i7iNdIV)

www.youtube.com/watch?v=vi4_jZjNdlY

6. "Ensuring Vestas' current and future competitiveness," by Anders Vedel, Executive Vice President & CTO, Vestas, June 21, 2016

www.vestas.com/~/media/vestas/investor /investor%20pdf/calendars/2016_cmd/04 technology%20%20service%20solutionspr int.pdf

- "The Digital Universe of Opportunities: Rich Data and the Increasing Value of the Internet of Things, EMC Digital Universe with Research & Analysis" by IDC, April 2014 www.emc.com/leadership/digitaluniverse/2014iview/internet-of-things.htm
- 8. "15 Mind-Blowing Stats About the Internet of Things" Giselle Abramovich, CMO.com, April 2015

www.cmo.com/articles/2015/4/13/mindblowing-stats-internet-of-things-iot.html

9. "The Internet of Things – How the Next Evolution of the Internet is Changing Everything," Cisco, 2011. www.cisco.com/web/about/ac79/docs/in

www.cisco.com/web/about/ac/9/docs/in nov/loT_IBSG_0411FINAL.pdf

 "Cloud for Industry," Siemens www.industry.siemens.com/services/globa l/en/portfolio/plant-data-services/cloudfor-industry/Documents/Onepager_Cloudfor-Industry_E10001-T430-A349-X-7600.pdf

- 11. "Sigma Air Utility: The hybrid service bundle," Kaeser Kompressoren www.kaeser.com/Products_and_Solutions/ sigma-air-utility/default.asp
- 12. "STILL: Using the SAP HANA Cloud Platform for the Internet of Things," SAP www.sap.com/asset/detail.2015-04apr.still-iot-hana-cloud-platform-ctvmp4.html
- 13. "Online and Mobile Are Transforming B2B Commerce," Forrester Research www.hybris.com/en/downloads/whitepaper/b2b-forrester-paper/529
- 14. "The Rise of the Chief Digital Officer," Russell Reynolds Associates www.russellreynolds.com/insights/thought -leadership/the-rise-of-the-chief-digitalofficer
- 15. "New IRIS' Asset Manager Solution from Tennant Company Leverages the Internet of Things to Help Customers Drive Measurable Results and Reduce Cost to Clean," Business Wire, October 13, 2015 www.businesswire.com/news/home/20151 013005487/en/IRIS%C2%AE-Asset-Manager-Solution-Tennant-Company-Leverages
- The Service Council Data, 2013 http://news.sap.com/wpcontent/blogs.dir/1/files/SAP-FS_CS_Infographic_PAN_Final.pdf
- 17. "Blount taps SAP SuccessFactors to get more out of employees," Tech Target http://searchsap.techtarget.com/feature/ Blount-taps-SAP-SuccessFactors-to-getmore-out-of-employees
- 18. "DeLaval: Creating the Workplace of the Tomorrow with SAP SuccessFactors Solutions," SAP SuccessFactors Business Transformation Study

www.successfactors.com/content/dam/su ccessfactors/en_us/resources/businesstransformation-study/delaval-bts.pdf

19. SAP Center for Business Insight 2015 calculation based on the Boston Consulting Group, "The Rise of Robotics" www.bcgperspectives.com/content/article s/business_unit_strategy_innovation_rise_ of_robotics 20. "ZEISS Vision Care: Mastering Integration Across 150 Applications with SAP Process Orchestration • Technology," SAP Business Transformation Study

https://go.sap.com/docs/download/2015/ 10/307b77e5-487c-0010-82c7eda71af511fa.pdf

- 21. "NORDYNE: Delivering products on time," SAP Success Story http://go.sap.com/docs/download/2014/1 2/003023aa-447c-0010-82c7eda71af511fa.pdf
- 22. "STIHL: SAP" BW powered by SAP HANA" Delivers Leaner Structures for Faster Business Processes," SAP Business Transformation Study

www.sap.com/bin/sapcom/en_us/downlo adasset.2014-11-nov-25-12.stihl-sap-bwpowered-by-sap-hana-delivers-leanerstructures-for-faster-business-processespdf.bypassReg.html

Note: All sources sited as "SAP" or "SAP benchmarking" are based on our research with customers through our benchmarking program or other direct interactions with customers.

Note: Some images used under license from Shutterstock.com



www.sap.com/contactsap

Studio SAP | 47179enUS (17/11)

© 2017 SAP SE or an SAP affiliate company. All rights reserved.

No part of this publication may be reproduced or transmitted in any form or for any purpose without the express permission of SAP SE or an SAP affiliate company.

The information contained herein may be changed without prior notice. Some software products marketed by SAP SE and its distributors contain proprietary software components of other software vendors. National product specifications may vary.

These materials are provided by SAP SE or an SAP affiliate company for informational purposes only, without representation or warranty of any kind, and SAP or its affiliated companies shall not be liable for errors or omissions with respect to the materials. The only warranties for SAP or SAP affiliate company products and services are those that are set forth in the express warranty statements accompanying such products and services, if any. Nothing herein should be construed as constituting an additional warranty.

In particular, SAP SE or its affiliated companies have no obligation to pursue any course of business outlined in this document or any related presentation, or to develop or release any functionality mentioned therein. This document, or any related presentation, and SAP SE's or its affiliated companies' strategy and possible future developments, products, and/or platform directions and functionality are all subject to change and may be changed by SAP SE or its affiliated companies at any time for any reason without notice. The information in this document is not a commitment, promise, or legal obligation to deliver any material, code, or functionality. All forward-looking statements are subject to various risks and uncertainties that could cause actual results to differ materially from expectations. Readers are cautioned not to place undue reliance on these forward-looking statements, and they should not be relied upon in making purchasing decisions.

SAP and other SAP products and services mentioned herein as well as their respective logos are trademarks or registered trademarks of SAP SE (or an SAP affiliate company) in Germany and other countries. All other product and service names mentioned are the trademarks of their respective companies. See http://www.sap.com/corporateen/legal/copyright/index.epx for additional trademark information and notices.

Run Simple