

Digitizing the Extended Supply Chain

How to Survive and Thrive

in today's digital economy

SAP Run Simple

HAN'S POINT OF VIEW



"To win in the digital economy, we have to reimagine how we design, plan, make, deliver, and operate our products and assets."

Hans Thalbauer
SVP Extended Supply Chain
SAP SE

Dear Customers,

Digitization will reinvent the world economy with individuals, businesses, and societies becoming interconnected in real time. This new digital economy is more collaborative, intelligent, responsive, and efficient, with dramatic increases in productivity and economic value.

The digital economy will transform the way we live and work, how business runs, and how society functions – and it will do this in a timeframe that is much shorter than any other major economic transition in history.

- Everything is becoming digitized
- Everything, and everyone, is connected
- Everything is being shared via the cloud
- Everything is now personalized
- Everything is directly available

To be in a position to create and capture these opportunities, companies must develop an environment in which they can manage information and processes simultaneously across the extended supply chain. This new evolution of supply chains is more connected, intelligent, responsive, and predictive. It enables companies to drive **customer-centric** processes and deliver **personalized products** uniquely built and delivered for the "segment of one." These demanding customers have to be serviced across a **business network** of global partners, who are increasingly challenged by **resource scarcity.**

This transformation has, and will continue to impact the business processes and systems that are required to remain competitive. It will change how we design, plan, make, ship, and operate our products and assets.

I respectfully invite you to join this conversation by dedicating your time to this white paper. We have invested our best minds and given you what I believe is a comprehensive road map to defeat complexity and accelerate growth. Our vision is to help the world run better and improve people's lives. The insights that follow are the tools to make that vision a reality.

Thank you for your interest, and I look forward to your feedback.

Run Simple



Hans Thalbauer
SVP Extended Supply Chain
SAP SE

SAP Digital Extended Supply Chain Whitepaper (02/16) © 2016 SAP SE. All rights reserved

TABLE OF CONTENTS

Executive Summary **4**

Reimagining the Extended Supply Chain **7**

Digital Business Framework **10**

Customer-Centricity 12

Individualized Products 13

The Sharing Economy 14

Resource Scarcity 15

The Digital Core 16

How Does It Come Together? 17

Why SAP? **18**

SAP is Committed to Innovation 19

End-to-End Digital Business Solution 20

SAP Services and Support to Drive your Success 21

SAP Ecosystem 22



SAP Digital Extended Supply Chain Whitepaper (02/16) © 2016 SAP SE. All rights reserved

EXECUTIVE SUMMARY

The big picture: The digital economy is real and it's here to stay

The Digital Economy

Executives know the world has changed. SAP's research shows 90% of CEOs believe the digital economy will have a major impact on their industry, though less than 15% are funding and executing on the plan.[1]

The digital economy is upending all industries and processes, placing a premium on speed, customer satisfaction, personalized products, and collaboration. These dynamics require companies to change how they interact with customers, suppliers, and other partners in the design, planning, production, and distribution of goods and services. They need to adopt a digitized, extended supply chain model that can respond immediately to dynamic changes and satisfy increasingly demanding customers.

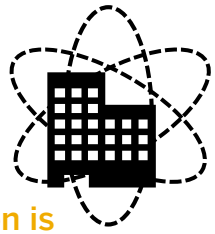
Putting your customers at the center of your business
Customers expect a new type of experience. Omnichannel sales strategies have raised the bar when ordering products and services. You can now order goods from anywhere, on any device, at any time. But companies need to change business processes to ensure the same level of service in designing, producing, planning, and delivering these products.

If a customer wants to be able to order a product online, within seconds, **customer-centric** processes are needed to deliver on that demand. Companies must transition to a true omnichannel fulfillment model, with each channel requiring specific supply chain processes and capabilities to support the manufacture and delivery of goods to the customer according to the customer's preference.

Capturing all forms of demand, both structured and unstructured, is critical to a more granular understanding of changing market conditions. You need to recognize and act on market and environmental dynamics — weather, traffic conditions, and localized sentiment data, for example — that may influence buying decisions. Calculating and adjusting demand in real time based on these ever-changing variables is essential.

Individualized products for the segment of one
Closely aligned with customer-centricity are the design, manufacture, and distribution of individualized products. Personalized solutions and products are everywhere, enabled by readily available technologies such as 3D printing, additive layer manufacturing, and variable product configurations, driven largely by the Internet of Things (IoT), Industry 4.0, and sensor technology.

To support the drive to service the segment of one, design processes must deliver all practical configurations and combinations, planning and manufacturing processes geared to support "lot size of one" production and delivery processes that profitably support smaller and more frequent shipments.



Digital disruption is happening TODAY

- **Uber** is one of the world's largest taxi companies, but it owns no taxis [2]
- **Airbnb** has one of the largest inventories of accommodations, but it owns no real estate [3]
- **Alibaba** is one of the world's largest e-commerce companies, but it owns no inventory[4]
- **Netflix,** with 75 million subscribers worldwide, is one of the world's largest movie distributors, but it owns no cinemas[5]
- **Apple** is one of the world's largest music retailers, but it owns no music[6]

SAP Digital Extended Supply Chain Whitepaper (02/16) © 2016 SAP SE. All rights reserved

EXECUTIVE SUMMARY

The big picture: The digital economy is real and it's here to stay

The Digital Economy

Business networks drive a sharing economy

Every business is more heavily dependent on its network of partners than ever before as we leverage contract manufacturers, logistics service providers, and other third-party organizations to expand reach and improve customer service. If not managed properly, this can result in wasted resources, higher operating costs, lost sales, and increased supply chain risk. It is critical to share information, experience, and processes to align and coordinate business decisions and collaborate across business networks.

There are numerous types of networks. For example, product stewardship networks manage global product safety and compliance across a global network of suppliers; manufacturing networks enable visibility and collaboration with both internal and contract manufacturing sites; and asset networks optimize asset usage, performance, and availability. These and other networks (and networks of networks) will be the platforms on which successful businesses innovate, collaborate, grow, and continually evolve – at both speed and scale.

Running a sustainable business in the face of resource scarcity

Demand is exceeding supply for many resources around the world. Raw materials such as water, minerals, oil, and gas are key components to many supply chains, but obtaining them is often a challenge. Labor scarcity is also a major issue, with the aging and shrinking workforce struggling to adapt to the changing skill sets required by the extended supply chain.

These challenges increase risk for an organization and drive the need for alternate formulas and recipes and sustainable manufacturing. Alternate sources of energy and leveraging reused or recycled materials are also key to lowering supply chain costs.

Early adopters are winning

There are huge opportunities and ramifications involved with the extended supply chain. According to a study by SCM World, 71% of supply chain executives see digital supply chains as disruptive and important technology with respect to supply chain strategies.[7]



71%

of companies say their digital maturity level is still "early" or developing"[8]



33%

of all industry leaders will be disrupted by digitally-enabled competitors by 2018[9]



$8 trillion

is the estimated value (through lower costs and higher revenue), to be delivered by the Internet of Things over the next decade[10]

SAP Digital Extended Supply Chain Whitepaper (02/16) © 2016 SAP SE. All rights reserved

EXECUTIVE SUMMARY

Road map to Run Simple: Steps to digitize your extended supply chain

REIMAGINING

Do you have the right strategy? Start by reimagining your business with business outcomes and customers at the center.



REIMAGINE
BUSINESS MODELS

- Drive business based on a true picture of customer demand, both structured and unstructured
- Deliver individualized products and services
- Leverage product platforms as a base for customization
- Leverage your network of partners to better design, make, and deliver products
- Take into account the scarcity of natural resources and talent in a sustainable business model



REIMAGINE
BUSINESS PROCESSES

Change or eliminate fundamental business processes by leveraging digital technologies to:

- Create more connected, market-driven, and customer-centric distribution networks
- Drive cross-departmental and company planning processes
- Transform asset management with predictive, connective capabilities
- Leverage the Big Data now available to drive predictive decision support and end-to-end visibility



REIMAGINE
WORK

- Automate non-value-added tasks in areas such as the warehouse and production floor
- Boost productivity and decision support by getting the right information to the right people to help them do their jobs more efficiently
- Improve user experience with self-learning software that enables workers to be more effective and efficient with 3D visualization and other interactive technologies

PLATFORM

In order to reimagine your business, you need to have the right platform in place. Leaders are investing in digital capabilities that are congruent with their strategy. The right technologies ensure agility and a rich environment for innovation. In addition, the platform should align to desired outcomes.

SAP's digital framework for the extended supply chain is based on the five key pillars of a digital plan and architecture:

1. **Customer-centricity** across all channels
2. **Individualized products** driven by Industry 4.0 and IoT to enable new business models and increase the need to manage Big Data
3. **Sharing economy** across all business networks
4. **Optimizing scarce resources** such as people and natural resources in a sustainable world
5. **Real-time visibility** across core business processes such as supply chain, R&D, manufacturing, and operations

ROI drives this significant phase of the transition to digital. It's not about any one of the five pillars, but rather how they all interconnect to achieve business outcomes.

We leverage **Design Thinking** as a our key approach to the reimagining phase. Design Thinking is a discipline that uses the designer's sensibility and methods to match people's business needs with what is technologically feasible and what a viable business strategy can convert into customer value and market opportunity.

SAP Digital Extended Supply Chain Whitepaper (02/16) © 2016 SAP SE. All rights reserved



REIMAGINING

THE EXTENDED SUPPLY CHAIN

In a connected world where every company is becoming a technology company, smarter products, assets, and services will drive new processes and opportunities across the extended supply chain.

SAP Digital Extended Supply Chain Whitepaper (02/16) © 2016 SAP SE. All rights reserved

DIGITAL INNOVATION IS REAL

Companies understand that hyperconnectivity and Big Data are the keys to value creation. Based on SAP's collaboration with thousands of businesses worldwide, we've seen that winning companies are moving quickly in three strategic areas:

REIMAGINE BUSINESS MODELS

- **Focus on customers** to capture a true picture of fluctuating demand by sensing, cleansing and harmonizing structured and unstructured demand signals
- **Individualize products** to deliver customized solutions based on individual end-customer need
- **Design product platforms** as the base for customization and postponement strategies to ensure customers get what they want, when they want it
- **Leverage business networks** with suppliers, outsourced manufacturers, customers, logistics service providers, products, and assets to better serve your customer
- **Optimize the utilization of labor and raw materials** to ensure a sustainable business model that takes into account the challenges of a shrinking and unskilled workforce and the demand and supply challenges of natural resources

New models will be established for digital transformation.

REIMAGINE BUSINESS PROCESSES

- **Customer-centricity** will both drive and transform the business processes around how we design, market, personalize, and deliver products and solutions
- **Integrated business planning** process needs to span across all departments (sales, marketing, purchasing, finance, R&D, manufacturing, and supply chain). This process must also cross company boundaries to deliver an agreed upon and aligned go-forward plan
- **Predictive software** and machine connectivity will transform how companies manage and maintain assets and run business processes
- **End-to-end visibility** across the extended supply chain will help to make informed and timely decisions through improved visibility and traceability

Any process can and will be modernized and digitized.

REIMAGINE WORK

- **Eliminate work** altogether by digitizing manual steps in the process and focusing on the value-added operations. This is already happening in areas such as manufacturing and warehousing through the use of robotics and automation
- **Improve productivity** and profitability by enabling users to access the right information at the right time on any device by leveraging the Big Data now available in role-based contexts
- **Use predictive and self-learning** software to improve user experience, machine-to-machine connectivity, and asset optimization
- **Use interactive technology** to improve user experiences, including voice recognition, augmented reality, and 3D visualization

Work will transform, and everyone will be a digital employee.

SAP Digital Extended Supply Chain Whitepaper (02/16) © 2016 SAP SE. All rights reserved

SAP HANA: THE GREAT SIMPLIFIER

In order to reimagine everything in the digital economy, agility and flexibility are required to adjust course at any time. This involves two key concepts: **simplification** and **innovation**.

Simplification is all about doing what we are already doing, but better, faster, and cheaper

Innovation is all about reimagining business models and customer value

The diagram below is at the heart of the digital business transformation. The idea is very simple but it took years to make it a reality: Leverage real-time visibility into demand and supply, bringing together transactions and analytics on the same platform. Uniting structured data (e.g., orders, forecasts) and unstructured data (e.g., social media and sentiment analysis) will change the way businesses plan, scale, and innovate.

In-memory computing is a concept brought to life by the breakthrough SAP HANA platform. While relatively young by commercial standards, SAP HANA's rapid adoption across multiple industries validates its massive potential for digital businesses.

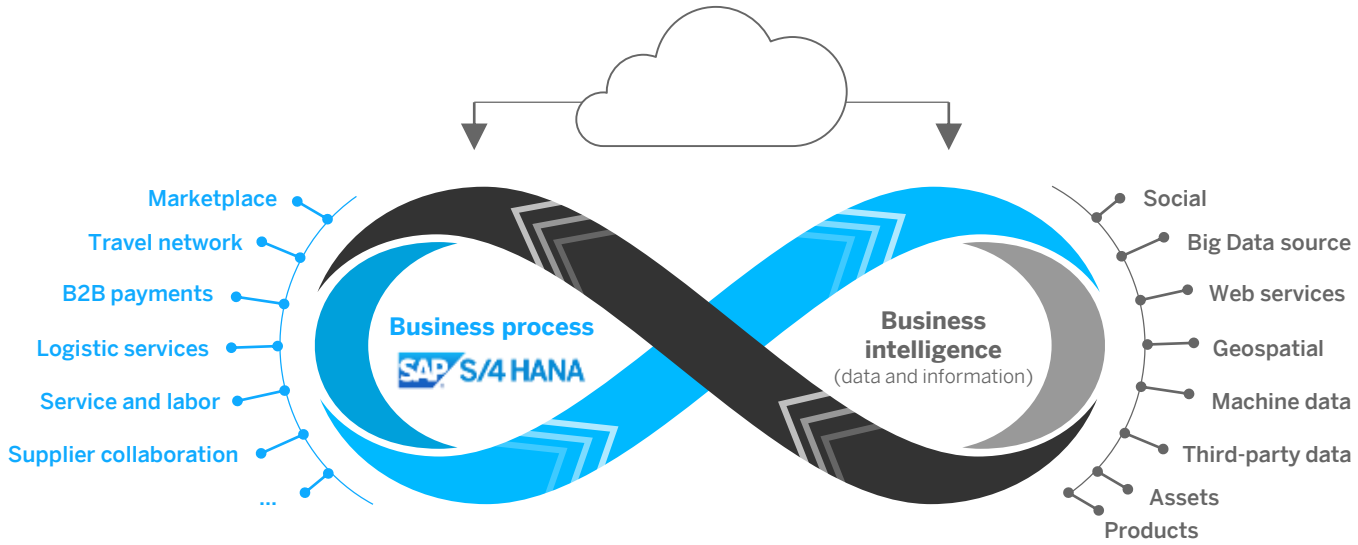
With in-memory computing, we can now finally:

- **Leverage Big Data** from sensors, weather, social, and geospatial sources. Bringing all data signals together leads to vastly improved visibility and recommendations across your extended supply chain, which can be instantly acted upon in transactional systems via human and machine-to-machine interfaces
- **Extend the business process** to interoperate with business partners in near real time via advanced cloud-based business networks
- **Modernize business processes** from the design of your products to the manufacturing and delivery of finished goods, running them in real time with no data replication and no batch programs

These capabilities open infinite new ways of optimizing business, driving business digitization, simplifying everything, reducing cost, and providing the agility required in a rapidly changing world.

SAP constructed an innovation road map designed to bring in-memory computing together with cloud computing and mobility. This strategy has been embraced by early adopters who are leading the transition to digital.

SMARTER DECISIONS + SMARTER TRANSACTIONS = SMARTER BUSINESS



SAP Digital Extended Supply Chain Whitepaper (02/16) © 2016 SAP SE. All rights reserved



DIGITAL BUSINESS FRAMEWORK FOR EXTENDED SUPPLY CHAIN

VALUE CREATION THROUGH DIGITIZATION

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

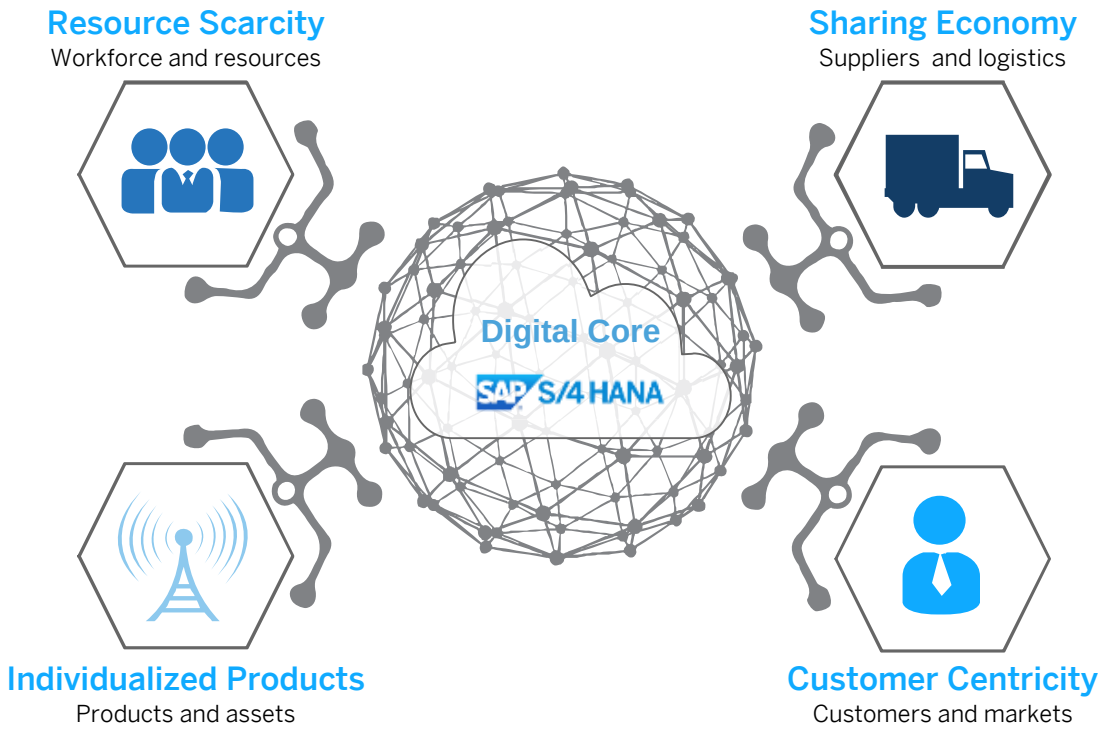
SAP Digital Extended Supply Chain Whitepaper (02/16) © 2016 SAP SE. All rights reserved

DIGITAL BUSINESS FRAMEWORK

Every company needs to think about digitization across five key pillars

SAP understands that the reimagining process helps crystalize the future business model. As a result, we have built a structured framework to help develop and execute on your digital business strategy: The digital framework for the extended supply chain. With this framework, the entire value chain can be digitized, including the core, which serves as the platform for innovation and business process optimization. Every company can develop a digital strategy across these five pillars.

1. Enable processes driven by **customer-centricity** through real-time customer and market visibility
2. Deliver **individualized products** by harnessing assets and the Internet of Things to drive the design, manufacturing, and delivery of smarter, customized products
3. Leverage the **sharing economy** to collaborate across all departments, companies, products, and assets
4. Build a sustainable organization in the face of **resource scarcity** in labor and natural resources
5. Enable **end-to-end visibility** and bring together transactions and analytics in real time to be smarter, faster, and simpler



SAP Digital Extended Supply Chain Whitepaper (02/16) © 2016 SAP SE. All rights reserved

CUSTOMER-CENTRICITY

Digital technology has **changed the game,** but customers **changed the rules.** Customers are more informed and connected across **any channel, anytime, anywhere, and on any device.**

The importance of customer-centricity and speed in today's consumer economy is well understood. Consumers increasingly expect products to be individualized to their unique specifications and delivered on demand. This new customer experience is changing the way businesses sense demand, design and make products, and deliver based on omnichannel execution.

Omnichannel sales

Todays customer can buy through numerous channels, at any time, on any device. We see retailers bringing the online experience to the store, and the store experience to online sales. This drives the need for business process change across logistics functions. The store, warehouse, and distribution center are all becoming fulfillment hubs to minimize inventory and maximize customer service.

Demand sensing

Demand planning in today's fast-paced, expanding, and rapidly changing economy is no easy task. Supply chain leaders are expected to quickly react to changes to improve efficiency, productivity, and customer satisfaction levels. With the digital economy comes digital demand signals, both structured and unstructured, from customers placing orders and making comments via social media on mobile devices. The ability to capture and analyze this new, unstructured "sentiment" data is key to getting closer to the customer and obtaining a clear picture of real-time demand.

Omnichannel fulfillment

When customers have the ability to place orders through any channel in real time, they also expect the order to be fulfilled in (near) real time. This has created opportunities for companies: Amazon offers same-day delivery, many brick-and-mortar retailers enable consumers to buy online and pick up at the nearest store, and Google and UberRUSH offer businesses door-to-door delivery services for their products in urban areas such as New York, San Francisco, and Chicago.

86%
of customers are willing to pay more for a better customer experience[11]

45%
of enterprises are building direct-to-customer fulfillment capabilities[12]

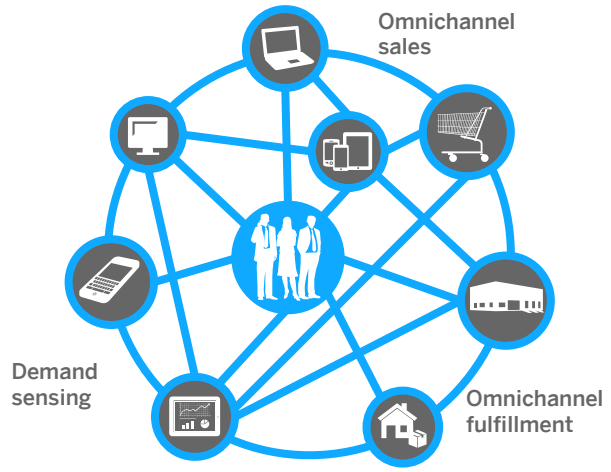
2.4 billion
brand-related conversations happen online every day[13]

Putting your customer in the center of your business processes

Customer-centric processes are created by harnessing order, forecast, point-of-sale, channel, and social data to sense both short-term and long-term demand.

Driving actual demand signals through the extended supply chain and connecting this data **with R&D, manufacturing,** and **supply chain** processes enables the design, production, and delivery of the most profitable solutions and services to the customer while maximizing customer satisfaction.

- **Integrated business planning** solutions that sense real-time demand signals and enable responsive planning to adjust to market dynamics
- **Warehousing** and **transportation** solutions that enable flexible logistics processes



SAP Digital Extended Supply Chain Whitepaper (02/16) © 2016 SAP SE. All rights reserved

INDIVIDUALIZED PRODUCTS

The digital economy will be driven by the need and ability to **personalize solutions** for individual customer demands. This will **transform the way that companies design, produce, and deliver goods and services.**

Customers expect a customizable experience. Personalized solutions and products are everywhere. You can design your own sneakers, customize your own drinks in vending machines, configure cars and motorbikes, and print personalized chocolates. Companies understand the full potential of the close relationships between physical and digital assets and the Internet of Things. We are witnessing new use cases across industries with breathtaking results.

Platform for personalization

The common feature of most companies' personalization strategy is a strong platform that is used as a base for customization. This has been common in the car industry for several years, with companies allowing you to customize your base model to order. The mobile phone is another great example of a platform. Customers can choose a base model from a small selection and then customize the device with apps and visual effects. This means that, from five or six base options, individual customization options are practically limitless.

Smart products drive new business models

IoT and Industry 4.0 are changing traditional business models by connecting people, products, and assets. This explosion of Big Data is driving the growth of individualized products and the segment of one. As companies embed sensors in their products, they are themselves becoming technology companies, and re-thinking the value delivered by their products.

3D printing can revolutionize industries

3D printers are having a growing effect on the personalization of products. Sneaker manufacturers are prototyping the ability to print a unique midsole. Customers' running style will be tested on a treadmill in the store to determine individual cushioning needs. Chocolate manufacturers can personalize a customer's favorite treat by printing unique shapes or edible messages. Logistics service providers are investing in 3D printing farms to provide value-added customization services just prior to shipment.

Additive layer manufacturing will change how we design, produce, and bring products to market, and provide competitive differentiation and personalization to our products.

3 billion
Internet users and an expected 30-50 billion connected devices by 2020[14,15,16]

14 out of 30
top global brands by market capitalization are platform-oriented companies[17]

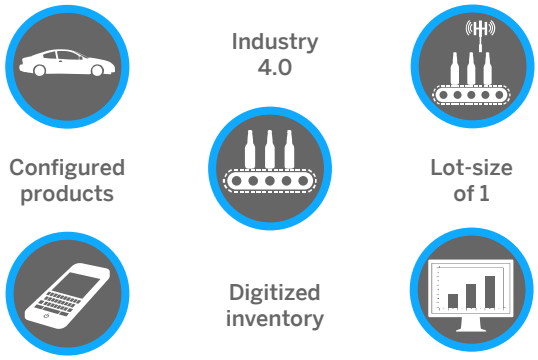
70%
of global discrete manufacturers will offer smart connected products, driving the need for new digital supply chain capabilities[18]

42%
of consumers are interested in technology to customize and personalize products, and 19% indicate a willingness to pay a 10% price premium to customize or personalize the products they purchase[19]

Reimagine your products for the segment of one

In today's dynamic landscape, customers demand better, individualized products faster. To satisfy this demand, people, processes, and technology must be connected across the organization.

- **Product lifecycle management** solutions that enable the design of configurable and customizable products
- **Manufacturing** solutions designed for responsiveness to deliver the lot size of one
- **Asset management** solutions that leverage the IoT to improve performance, reliability, and uptime



SAP Digital Extended Supply Chain Whitepaper (02/16) © 2016 SAP SE. All rights reserved

THE SHARING ECONOMY

Trillions of dollars of commerce moving in silos + millions of companies attempting to innovate on their own = **lost opportunity** to improve the lives of billions of end users.

The sharing economy is a social ecosystem built around the sharing of human and physical resources. It includes the shared design, manufacture, distribution, and consumption of goods and services by different people and organizations.

When everything is connected, you can collaborate at a new level

When we translate this sharing economy to the business world, we see an increasing dependence on collaboration across the network, with suppliers, contract manufacturers, logistic service providers, and other partners. There is also a need to collaborate not only people and companies, but also with assets. The sharing economy can therefore be thought of as an extension of the IoT where everything is connected.

Transparency is the core of a strong business network

Business networks help manufacturers gain the necessary insights into customers' needs, suppliers' actions, and contract manufacturers' performance. This not only ensures high quality and standards, but also that increasing demands for sustainability are met. This process transparency improves collaboration and decision making as well as flexibility to respond to changing customer and economic demands..

Network of networks

As businesses expand globally, the ability to successfully operate within business networks will mean the difference between winning and losing. These networks (and networks of networks) will be the platforms on which successful businesses innovate, collaborate, grow, and continually evolve – at both speed and scale.

Networked companies

are 50% more likely than their peers to have increased sales, higher profit margins, and be a market leader[20]

50–75%

faster transaction cycles are being achieved with the Ariba Network[21]

50%

improved efficiency through real-time, automated collaboration with suppliers[22]

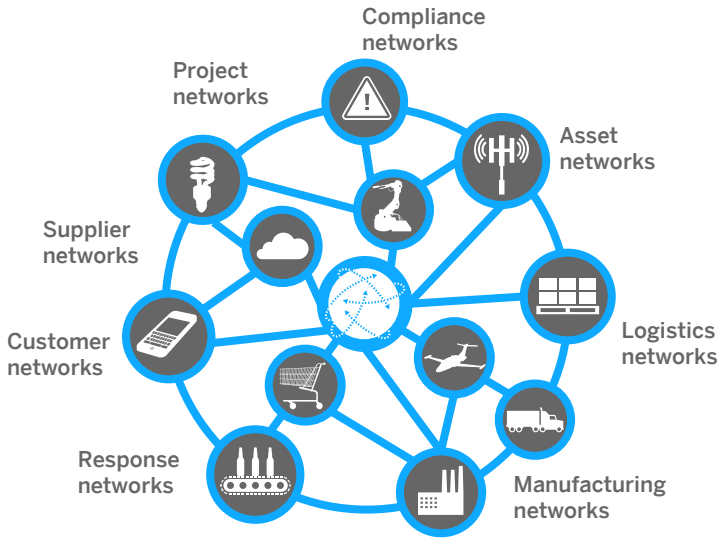
Port of Hamburg

brings together port and road traffic conditions, truck availability and incoming/outgoing shipment schedules to reduce idle truck/ship time. The solution allowed the port to increase container handling capacity by **178%** within the same land area.[23]

Connect business to the world and the world to your business

The extended supply chain is at the center of these business networks as we collaborate with customers, suppliers, outsourced (or contract) manufacturers, logistics service providers, and many other partners on a daily basis.

- **Project networks** drive collaboration during the design process to share drawings, models, and 3D designs across departments and companies and manage the change management processes
- **Supplier networks** streamline the selection, onboarding, and compliance of the suppliers and their materials
- **Manufacturing networks** enable internal and contract manufacturers to be treated as a single, global plant floor
- **Asset networks** optimize usage by collaborating on technical data, real-time insights, and predictive maintenance through machine-to-machine (M2M) connectivity
- **Customer networks** enable a market-driven world where visibility and response to fluctuating demand and sentiment about your products and company are critical
- **Logistics networks** track and trace materials, products, and assets throughout their complete lifecycle



SAP Digital Extended Supply Chain Whitepaper (02/16) © 2016 SAP SE. All rights reserved

RESOURCE SCARCITY

The **shortage of resources around the world** is a major factor for all businesses and the supply chains that support them.

Resource shortages are affecting businesses on many fronts

Talent shortage

The skills required to run a digitized supply chain have evolved with the emergence of Big Data, both structured and unstructured, now available from informed customers, connected assets, social media, and the Internet of Things. This drives the need for data scientists who can analyze and make sense of this wealth of information in real time.

To manage increasingly fluctuating demand, we are also seeing a huge rise in the use of contingent labor. At the same time, where and how labor is utilized is evolving. For example, in warehouses, we see augmented reality capabilities optimizing the workforce and, increasingly, robotics replacing the workforce.

Environmental responsibility

The need for raw materials such as water, minerals, oil, and gas is a key component to many supply chains, but these resources are becoming increasingly difficult to obtain as demand exceeds supply. At the same time, geographic change through growth in emerging markets is increasing the demand for finished goods. These trends have been building over the past several years, and they will continue to gain momentum. As a result, manufacturers will need to do more with less.

Minimizing risk

A key principle of sustainable operations is to encourage people and processes to embrace safety and risk management. Proactive risk management is achieved by performing a thorough assessment of all operational risks, designing and implementing controls, communicating safety information, and managing change safely in the plant environment with an eye toward improving safety.

64%
of companies say that priority access to scarce raw materials/capacity and collaborative cost reduction with suppliers are extremely relevant to their competitive advantage[12]

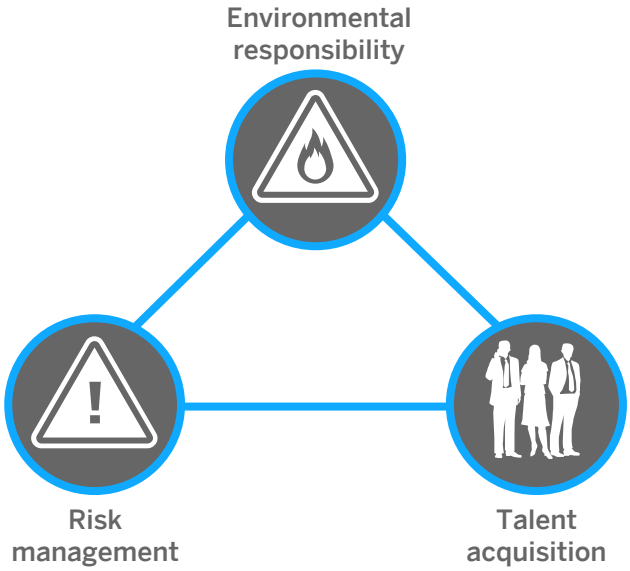
83%
of executives indicate they're increasingly using contingent workers – at any time, on an ongoing basis[24]

9 billion
people will be in the world by 2050.[25] It is predicted that, by 2030, the world will need to produce around 50% more food and energy, together with 30% more fresh water, while mitigating and adapting to climate change.[26]

Building sustainability into you business processes with SAP

Sustainability will play a particularly important role in how businesses run moving forward. Corporate social responsibility used to be a luxury, but not anymore. Sustainability is becoming the lens through which a business is judged by its consumers, workforce, society, and even its investors.

- **Innovation and design** processes that deliver sustainable products to the market
- **Product stewardship network** that manages global product safety and compliance throughout the product lifecycle
- **Track-and-trace** solutions to ensure visibility from raw materials to finished products and contain the effects of product recalls



SAP Digital Extended Supply Chain Whitepaper (02/16) © 2016 SAP SE. All rights reserved

THE DIGITAL CORE

A new generation of solution, running **in real time, integrating predictive, Big Data, and mobile,** will change how we work, how businesses are run, and how information is consumed. **The future is here.**

With advanced in-memory computing, you can free yourself from running the business in batch mode and building complex procedures. You can run simply and unleash the full power of the digital business.

Real time

Real-time optimization of business processes will have massive implications for how we design, plan, make, and deliver products; how we respond to changing supply and demand; and how we operate and utilize assets.

Power of prediction and simulation

Every employee can leverage real business insights, and planners can simulate scenarios and perform "what if" analyses. You can leverage predictive tools to drive perfect decisions, improve productivity, and increase profitability.

Agility

Rapidly bring new products to market, onboard new suppliers, or reflect changes in business dynamics and fluctuations in supply and demand.

Deployment choice and lower TCO

The consuming solution to run the core has to be simple. Companies now have the choice to deploy in house or in the cloud. In-memory computing will also have a significant impact on TCO and will free up more budget for innovation.

Consumer-grade user experience

User experience is key to success; it drives adoption, user engagement, and, ultimately, productivity.

52%

of manufacturing companies expect to be highly vertically integrated in the next five years[12]

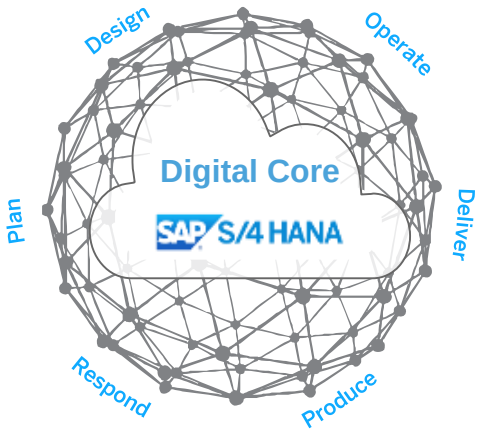
SMART Modular

"SAP Sales and Operations Planning powered by SAP HANA helps SMART Modular manage our sales and operations planning in a collaborative and efficient manner. We see a single version of the plan from sales to planning to materials to the factory, all of which can be correlated to financial performance. The result is true integrated business planning."[27]

Simplify with SAP

With the advent of in-memory computing, we see an evolution: from data moving to the application, to the application moving to the data. As companies seek simplification amid the increased complexity of a global economy with multiple channels and huge volumes of Big Data, there is a need to collaborate better across business networks and have a strong digital core at the center of business processes. With SAP solutions, you can simplify, connect, and enable processes along the extended supply chain.

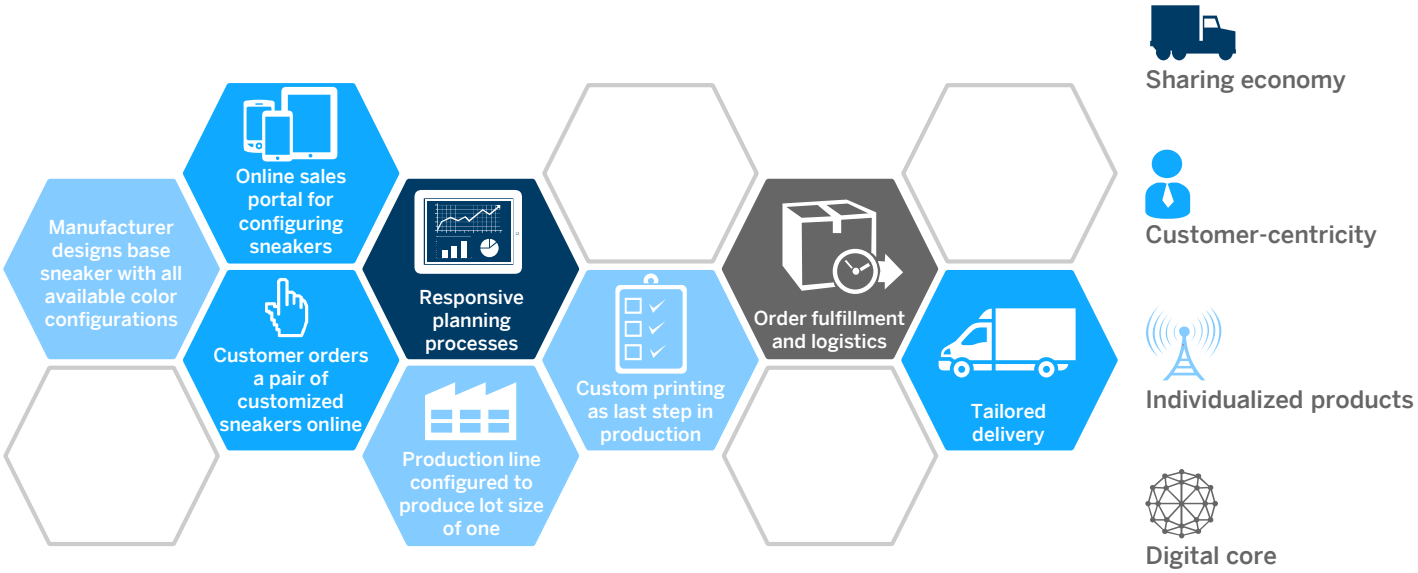
- Design for sustainable product innovation to win market share while meeting regulatory and quality requirements
- Plan with demand-driven business processes that integrate strategic, financial, sales, and operational goals
- Respond and orchestrate by sensing and capturing real-time demand and supply data and responding quickly and profitably
- Produce using agile and automated manufacturing processes to ensure full visibility of internal and external manufacturing operations
- Deliver through integrated logistics and order fulfillment processes to get the right product to the right place at the right time
- Operate and manage all assets to lower risk, improve safety and quality, and improve return on assets



SAP Digital Extended Supply Chain Whitepaper (02/16) © 2016 SAP SE. All rights reserved

HOW DOES IT ALL COME TOGETHER? – EXAMPLE

CONSUMER INDUSTRIES



Leading consumer companies are leveraging digital technologies to serve consumers in moments of consumer need – in this case, the moment the consumer needs new personalized sneakers.

The sneaker manufacturer has created a configurable design of a new customizable sneaker, with many possible color combinations. This design is handed over to both the sales and manufacturing organizations. The sales team can then enable customers to design their individualized sneakers either online or in store. The customer can specify unique text or numbers to be stacked onto the sneaker. The customer can also determine the shipping rules and instructions.

At the moment an order is placed, through any sales channel, the specific demand is instantly visible, and the specific order is planned and scheduled at an appropriate manufacturing facility.

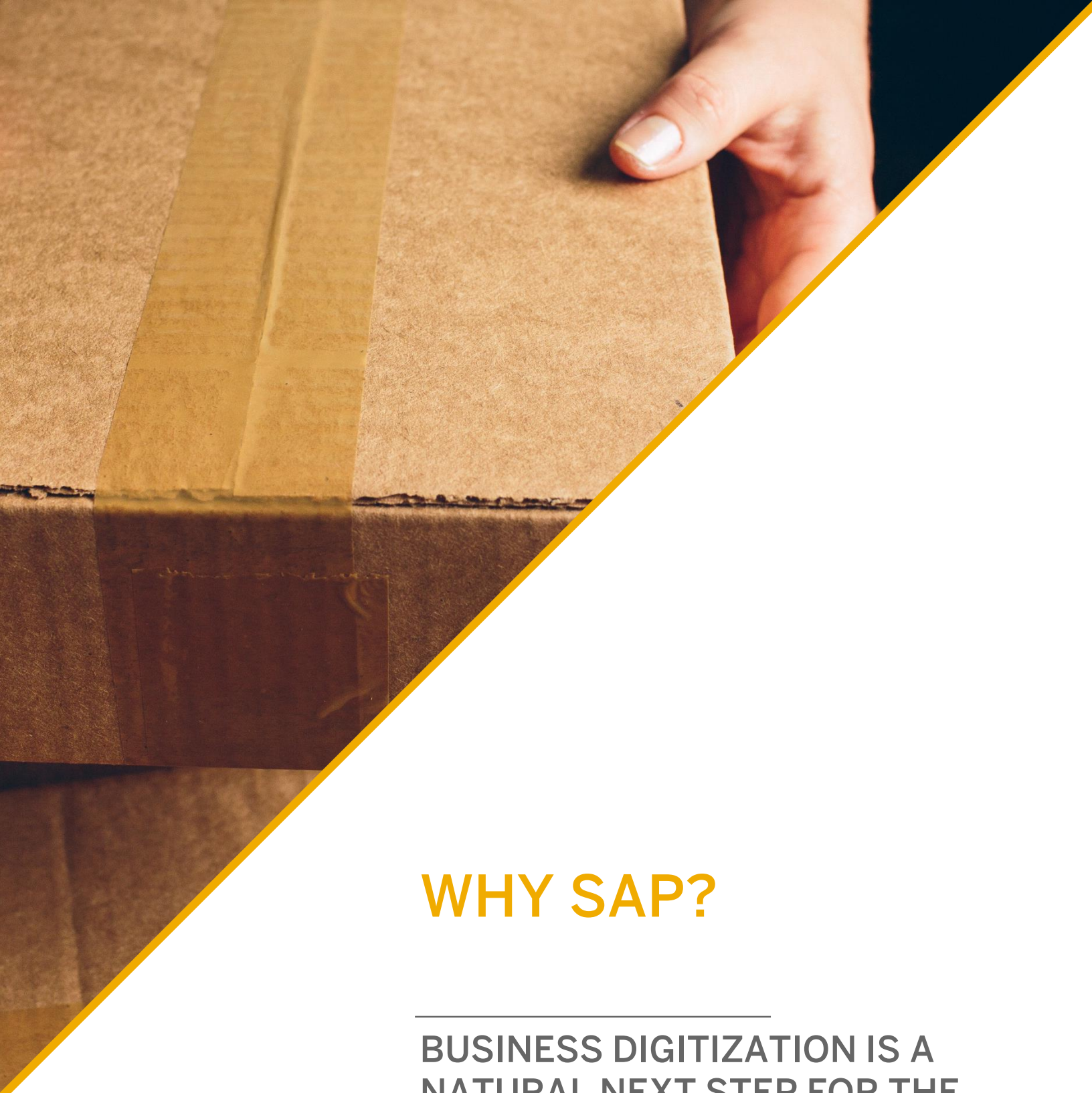
The production line is set up to create all combinations of the sneaker for a "lot size of one."

At the final production step, the unique text is stitched onto each sneaker. The sneakers are then packed, wrapped, and shipped to the desired pickup or delivery location based on the shipping rules determined by the customer.

The diagram above demonstrates how leveraging a digitized, extended supply chain can deliver a personalized solution by putting the customer in the center of the process.

The benefits of this scenario are significant:
- Better consumer engagement and insights
- Stronger competitive differentiation
- Compelling and holistic brand experience

SAP Digital Extended Supply Chain Whitepaper (02/16) © 2016 SAP SE. All rights reserved



WHY SAP?

BUSINESS DIGITIZATION IS A NATURAL NEXT STEP FOR THE #1 BUSINESS APPLICATION COMPANY

It took years of innovation, strategic investment, and the forging of new strategic relationships to build the end-to-end digital business platform.

SAP Digital Extended Supply Chain Whitepaper (02/16) © 2016 SAP SE. All rights reserved

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

GLOBAL PRESENCE AND RELEVANCE

- **77K employees** representing 120 nationalities
- **300K customers**
- SAP operates in **190 countries**

INDUSTRY FOCUS

- Solutions for **25 Industries**
- **98% of top-valued brands** are our customers
- **74% of the world's transactions** are managed on SAP

DIGITAL ECONOMY - READY

- **95 million** business cloud users
- **2.0 million connected** businesses
- **$740 billion+** in B2B commerce
- **99%+ of mobile devices** connected with SAP messaging

INNOVATION LEADER

- 2011 **SAP HANA** launched
- 2012 **SAP Cloud** launched
- 2014 **SAP business networks** largest marketplace in the world
- 2015 **SAP HANA Cloud Platform**
- 2015 **SAP S/4 HANA:** most modern ERP system

SUPPLY CHAIN LEADER

- **2014 leader** in supply chain management market share according to Gartner[28]
- **2014 market leader** in transportation management systems by ARC Advisory Group[29]

MANUFACTURING A LOT SIZE OF ONE

Harley Davidson reconfigured its York, Pennsylvania operations to enable all machinery and logistics devices to be equipped with sensors and location awareness. The factory reduced the lead time to produce customized motorbikes **from a 21-day cycle to six hours.** Each model has more than 1,000 configuration options, and one motorcycle rolls off the line every 89 seconds.[30]

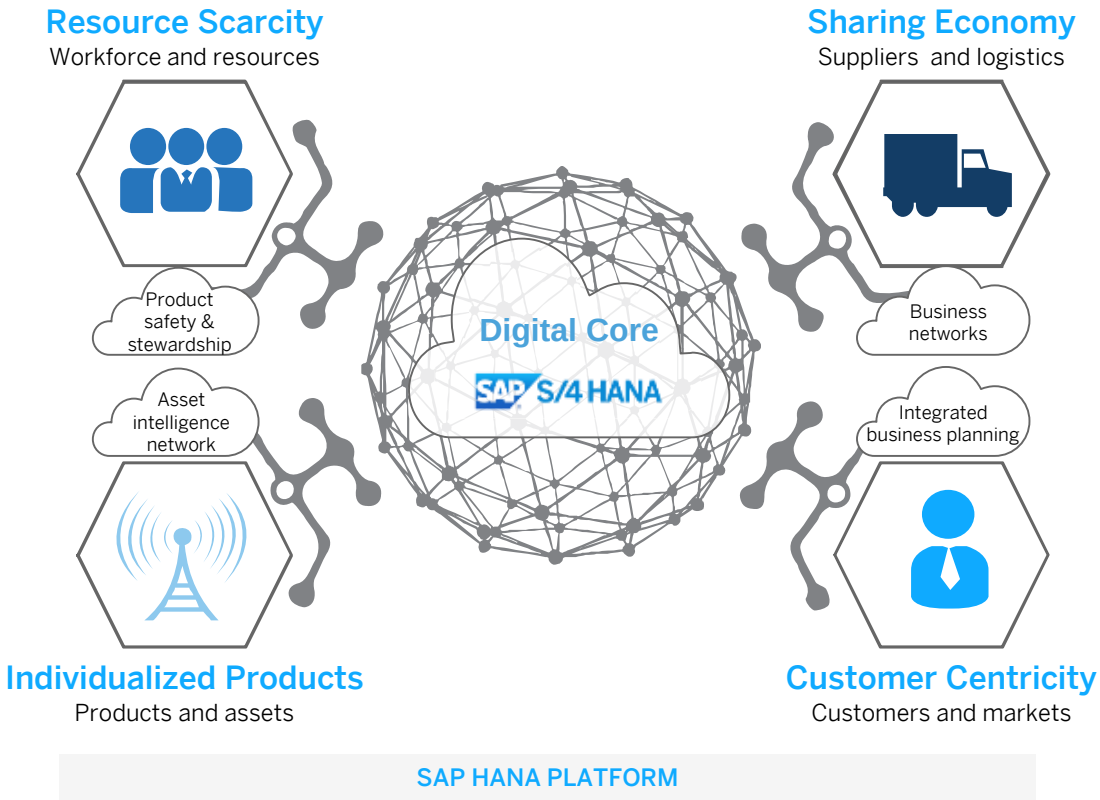
CONNECTED ASSETS

Kaeser Compressors Inc., one of the world's largest suppliers of compress air systems, is delivering a **high level of customer service** through real-time monitoring of parameters – such as power consumption, operational availability and safety, and compressed air quality – from a customer's air station against minimum and maximum allowed values.[31]

SAP Digital Extended Supply Chain Whitepaper (02/16) © 2016 SAP SE. All rights reserved

END-TO-END DIGITAL BUSINESS SOLUTION

Through our innovations and over $30 billion in strategic acquisitions, SAP has the best solution portfolio and expertise required to enable your digital business strategy. SAP is the largest cloud company with 80 million+ users and has the fastest growing solution portfolio to support the entire digital value chain. SAP is the largest supply chain vendor in the world, according to leading industry analysts. With 74% of the world's transactions running through SAP, 7,200+ customers leveraging SAP HANA, and 1,600+ customers leveraging our Internet of Things technologies to drive new business models, SAP is the **preferred** choice to make your digital extended supply chain a reality.



SAP will bring expertise, assets, and the proven methodologies required to support the development of your digital business strategy. These capabilities will be leveraged throughout SAP's collaborative value and innovation framework.

EXPERTISE

- Experts in **25** industries and **11** lines of business
- **6,000+** Design Thinking experts – sales, services, development
- User experience of the future
- Enterprise architecture
- Data scientists

ASSETS

- **60+** business process benchmarking and best practice assessments
- **600+** industry-focused innovation scenarios
- Innovation case studies by industry
- Infrastructure to drive proofs of concept
- **13+** co-innovation and living labs with **470+** customer co-innovation/Design Thinking discussions from 2014 to date

METHODOLOGY

- Business case methodology
- Design Thinking
- Benchmarking
- Value partnership framework

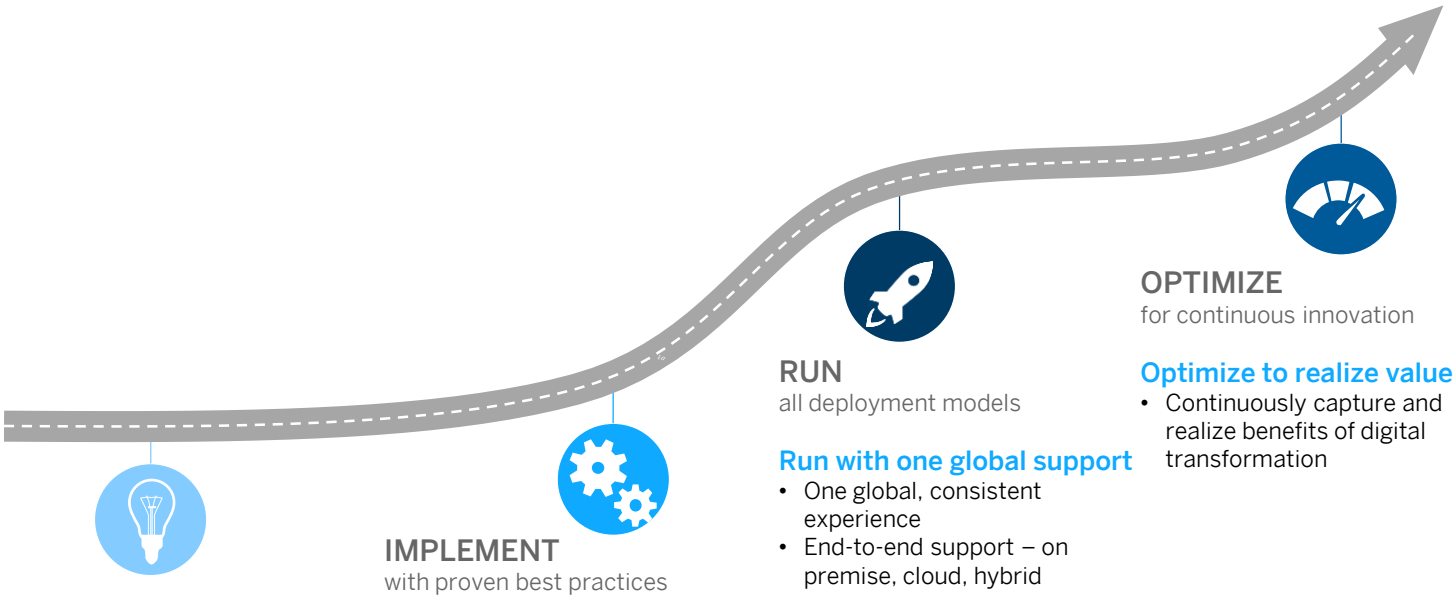
SAP Digital Extended Supply Chain Whitepaper (02/16) © 2016 SAP SE. All rights reserved

SAP GLOBAL SERVICES AND SUPPORT

In the digital economy, simplification and business innovation matter more than ever. SAP has a broad range of services to cover the end-to-end digital transformation journey, ranging from advising on a digital innovation road map and plan, to implementing with proven best practices, to the ability to run across all deployment models and ultimately optimize for continuous innovation across your digital journey. SAP provides both choice and value within our services, allowing you to tailor the proper approach based on your needs.

Turn to the 30,000 consultants and support professionals who can bring your digital strategy to life. The Global Service & Support (GSS) organization provides a consistent experience – on premise, cloud, or hybrid. GSS provides the expertise, assets, and the proven methodologies required to accelerate business innovation, reduce TCO, and run a stable platform (on premise or in the cloud).

SAP Activate is a new, simplified consumption experience introduced for SAP S/4HANA and cloud adoption. It provides a combination of SAP Best Practices, methodology, and guided configuration. In addition, we provide leadership in learning to drive quick time to value realization and a solid engagement foundation with SAP MaxAttention, SAP ActiveEmbedded, and SAP Value Partnership across the end-to-end customer lifecycle.



ADVISE

Simplify and innovate

- Digital innovation road map and plan
- Co-innovation by industry

IMPLEMENT

with proven best practices

Implement with SAP Activate

- Simplified consumption experience for SAP S/4HANA
- SAP Best Practices, methodology, and guided configuration

RUN

all deployment models

Run with one global support

- One global, consistent experience
- End-to-end support – on premise, cloud, hybrid

OPTIMIZE

for continuous innovation

Optimize to realize value

- Continuously capture and realize benefits of digital transformation

Learn | Extend / Innovate | Engagement Foundation | Support

SAP Digital Extended Supply Chain Whitepaper (02/16) © 2016 SAP SE. All rights reserved

SAP COMPREHENSIVE ECOSYSTEM

Orchestrating the world to deliver value faster

Our comprehensive ecosystem offers:

- A wide range of business services (banking, travel, etc.)
- Open architecture: choice of hardware and software
- Complementary and innovative third-party solutions
- Reach – partners to serve your business of any size anywhere in the world
- Forum for influence and knowledge
- A large pool of supply chain experts with broad and deep skill sets

BUSINESS NETWORK

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

INFLUENCE FORUMS AND EDUCATION

- 32 user groups across all regions
- 40+ industry councils
- SAP community >24 million unique visitors per year
- 2,400 SAP University Alliances



IMPLEMENTATION SERVICES

- 13,300 partner companies
- 3,200 service partners
- Delivering 1,300+ industry-specific solutions

INNOVATION

- 1,900+ OEM solution partners to extend SAP solutions
- 2,700 startups developing SAP HANA apps

PLATFORM AND INFRASTRUCTURE

- 1,400 cloud partners
- 1,500+ platform partners

CHANNEL AND SME

- 4,800 channel partners

SAP Digital Extended Supply Chain Whitepaper (02/16) © 2016 SAP SE. All rights reserved

ADDITIONAL RESOURCES

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

1. "Embracing Digital Technology" MIT Sloan and CapGemini, 2013, Chapter 3 exhibits http://sloanreview.mit.edu/projects/embracing-digital-technology/#chapter-3 /
2. "The Battle is for the Customer Interface" , Tech Crunch http://techcrunch.com/2015/03/03/in-the-age-of-disintermediation-the-battle-is-all-for-the-customer-interface/#.lpncejh:0sCd
3. "Airbnb will soon be booking more rooms than the world's largest hotel chains", Quartz, January 2015 http://qz.com/329735/airbnb-will-soon-be-booking-more-rooms-than-the-worlds-largest-hotel-chains/
4. "These Charts Show How Alibaba Became The World's Largest E-Commerce Company", Business Insider, May 2014 http://www.businessinsider.in/These-Charts-Show-How-Alibaba-Became-The-Worlds-Largest-E-Commerce-Company/articleshow/35125273.cms
5. Netflix letter to shareholders January 19, 2016 http://files.shareholder.com/downloads/NFLX/1298564620x0x870685/C6213FF9-5498-4084-A0FF-74363CEE35A1/Q4_15_Letter_to_Shareholders_-_COMBINED.pdf
6. iTunes Store Tops 10 Billion Songs Sold, Apple Press release, February 25, 2010 http://www.apple.com/pr/library/2010/02/25iTunes-Store-Tops-10-Billion-Songs-Sold.html
7. "Future of Supply Chain", by Kevin O'Marah Chief Content Officer, SCM World, Report 2015, page 9 http://www.slideshare.net/COLINMCKILLOP/2015-future-of-supply-chain
8. "Becoming a digitally mature enterprise", MITSloan Management Review July 2015, chapter 2 http://sloanreview.mit.edu/projects/strategy-drives-digital-transformation/
9. How your supply chain can drive digital transformation for your business, IDC 2015 http://a248.g.akamai.net/n/248/420835/e8ce26104ab723f16aef09733f20fb33777aced33d5672faf357fd310a941150/sapasset.download.akamai.com/420835/sapcom/docs/2016/01/9a9dc308-577c-0010-82c7-eda71af511fa.pdf
10. "Internet of Things in Logistics", Cisco & DHL, 2015 page 7 http://www.dhl.com/content/dam/Local_Images/g0/New_aboutus/innovation/DHLTrendReport_Internet_of_things.pdf
11. "2014 Global Consumer Barometer Index, American Express and Ebiquity", 2014 http://about.americanexpress.com/news/docs/2014x/2014-Global-Customer-Service-Barometer-US.pdf
12. "The Chief Supply Chain Officer Report 2014" SCM World, 2014, pg. 15, 22, 11 http://www.e2open.com/assets/pdf/papers-and-reports/SCMWorld_Chief_Supply_Chain_Officer_Report_2014.pdf
13. "1000heads on "Word of Mouth and the Internet" Keller Fay Group, 2011, http://www.kellerfay.com/tag/internet/
14. "ITU releases 2014 ICT figures " UN International Telecommunications Union, 2014, http://www.itu.int/net/pressoffice/press_releases/2014/23.aspx#.VaaCmaPD_IW
15. Internet Users Surge to Almost 3 Billion Worldwide, Time, November 2014 http://time.com/3604911/3-billion-internet-users/
16. EMC World 2015: 30 billion connected devices by 2020, ITPro, 2015 http://www.itpro.co.uk/storage/24560/emc-world-2015-30-billion-connected-devices-by-2020
17. "Why Platforms Beat Products Every Time", MIT Sloan Executive Education, June, 2015 http://executive.mit.edu/blogpost/why-platforms-beat-products-every-time#.VruZ3_krKc0
18. "IDC FutureScape: Worldwide Manufacturing Supply Chain 2015 Predictions", IDC, Dec 2014, http://www.idc.com/research/viewtoc.jsp?containerId=253421
19. "Consumer Products Trends: Navigating 2020", Deloitte University Press, June 25, 2015, http://d27n205l7rookf.cloudfront.net/wp-content/uploads/2015/06/DUP-1025_CP2020_FINAL1.pdf
20. The rise of the networked enterprise: Web 2.0 finds its payday, McKinsey http://www.mckinsey.com/insights/high_tech_telecoms_internet/the_rise_of_the_networked_enterprise_web_20_finds_its_payday
21. SAP Benchmarking, as cited in: Building the Networked Business of the Future, SAP Insider, April 2015 http://sapinsider.wispubs.com/Assets/Articles/2015/April/SPI-building-the-networked-business-of-the-future
22. SAP Benchmarking, 2015, http://go.sap.com/docs/download/2014/11/c86c3c0f-497c-0010-82c7-eda71af511fa.pdf
23. "Simpler Connections at Germany's Largest Seaport" http://www.sap.com/customer-testimonials/transportation-logistics/hamburg-port-authority.html
24. "Workforce 2020: Building a strategic workforce for the future" Oxford Economics, 2014, http://www.oxfordeconomics.com/workforce2020
25. Water and food security, Un Water Org, 2015 http://www.un.org/waterforlifedecade/food_security.shtml
26. "2030 – The Perfect Storm Scenario", The Population Institute, page 2 https://www.populationinstitute.org/external/files/reports/The_Perfect_Storm_Scenario_for_2030.pdf
27. Srini Tanikella, Director, IT Solutions, SMART Modular Technologies, "SMART Modular Technology Case Study", SAP, https://dam.sap.com/mac/download/a.htm?c=46&k=7Sf7gRlN07kS0m4DCDCfFFmfXl55veSSCNVN1lCkiCSREf57mb
28. SAP Continues as Leader in Supply Chain Market, May 26, 2015, http://news.sap.com/sap-continues-leader-supply-chain-market/
29. SAP Named Market Leader in Transportation Management Systems by ARC Advisory Group, July 14, 2015 http://news.sap.com/sap-named-market-leader-transportation-management-systems-arc-advisory-group/
30. Harley-Davidson -- Driving a Future of Excellence, Industry week, 2014 http://www.industryweek.com/iw-best-plants/2013-iw-best-plants-winner-harley-davidson-driving-future-excellence
31. Source: SAP HANA Use Cases, KAESER KOMPRESSOREN, 2014 http://www.sap.com/customer-testimonials/industrial-machinery/kaeser-kompressoren.html

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

Note: Some images used under license from Shutterstock.com

Note: Logos contained in this document are used with the permission of SAP's partners.

SAP Digital Extended Supply Chain Whitepaper (02/16) © 2016 SAP SE. All rights reserved



www.sap.com/contactsap

SAP Statement of Confidentiality and Exceptions

The information in this presentation is confidential and proprietary to SAP and may not be disclosed without the permission of SAP. This presentation is not subject to your license agreement or any other service or subscription agreement with SAP. SAP has 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's strategy and possible future developments, products and or platforms directions and functionality are all subject to change and may be changed by SAP 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. This document is provided without a warranty of any kind, either express or implied, including but not limited to, the implied warranties of merchantability, fitness for a particular purpose, or non-infringement. This document is for informational purposes and may not be incorporated into a contract. SAP provides this information as guidance only to illustrate estimated costs and benefits of the predicted delivery project. These materials may be based upon information provided by you, information provided by other companies and assumptions that are subject to change. These materials present illustrations of potential performance and cost savings, and do not guaranty future results, performance or cost savings. SAP assumes no responsibility for errors or omissions in this document, except if such damages were caused by SAP´s willful misconduct or gross negligence.

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, which speak only as of their dates, and they should not be relied upon in making purchasing decisions.

© 2016 SAP SE or an SAP affiliate company. All rights reserved (02/16).

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.

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. Please see http://www.sap.com/corporate-en/legal/copyright/index.epx#trademark for additional trademark information and notices. 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 SE or its affiliated companies shall not be liable for errors or omissions with respect to the materials. The only warranties for SAP SE 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, which speak only as of their dates, and they should not be relied upon in making purchasing decisions.

SAP Run Simple