Airlines in a Digital World
Provide a Reliable, Personalized Experience while Increasing Profitability

SAP

Run Simple

The world is changing rapidly. In order to survive, airlines need to leverage the opportunities of this new digitized world and operate and serve their travelers in a way that will spark loyalty and sustainable profitability.

Phil Te Hau
Head of Passenger Travel & Leisure
SAP

Dear Travelers and Partners,

The airline business is certainly a challenging one. Airlines are now at the brink of the digital era, which will require them to adjust or be overtaken by others.

Airlines in the last decades have often struggled to remain or become profitable. While there have always been familiar challenges, such as volatile fuel costs, unforeseen weather or volcano disruptions, security or heath threats, a major economic challenge for traditional carriers has been the competition from airlines with low-cost or subsidized business models.

Airlines have faced this challenge by adopting some of the practices of the low-cost carriers and seeking to improve efficiency to cut costs. We've also seen a consolidation in the market – mergers, acquisitions, the formation of airline "groups" along with the existing alliances. This consolidation might take on a new direction with low-cost carriers starting to collaborate more with the major carriers, forming new "alliances."

In the last few years, however, airlines have been facing a new challenge – the digitally empowered travelers with ever-increasing expectations and powerful voices in the social media. At the same time though, digitization provides a huge opportunity for airlines to redefine their role in the passenger travel world and to leverage technology to reach new levels of insight, flexibility, effectiveness, and service to travelers. Airlines must change from simply providing transportation services from point A to point B to becoming a partner for travelers that provides a consistent, relevant, and personalized experience while adding new revenue streams and becoming more profitable by enhancing the product portfolio.

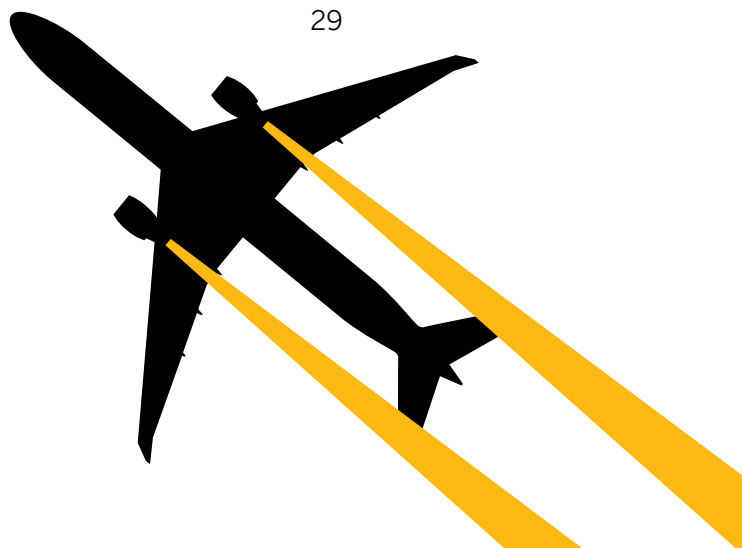In the following pages we will discuss how airlines can:

- Redefine their role and find new revenue and profit sources by providing innovative products and services
- Create experiences for the traveler that spark loyalty and create brand value
- Use digital technology to optimize their operations and move away from a purely reactive or planning model to a flexible predictive model

As the industry looks ahead to evaluate its risks, possibilities, and opportunities, leaders will profit early from these dramatic changes and even help shape this new digital world, leaving the laggards struggling to catch up – there is no time to lose.

Phil Te Hau
Head of Passenger Travel & Leisure
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Big picture: The digital economy is real and will continue to transform the airline and travel industry

The digital economy

Five technology trends are shaping the digital economy – hyperconnectivity, supercomputing, cloud computing, cybersecurity, and a smarter world focused on outcomes. The pace at which these trends are evolving is staggering. In the next 10 years, 40% of the S&P 500 will no longer exist.[1]

These technology trends have a tremendous impact on what traveler engagement means. Airlines can't afford to ignore the opportunities to connect with their travelers in a different way, optimize operations, and use the power of predictive analytics to increase safety and reduce maintenance costs. Airlines need to act fast if they want to stay ahead of the competition – and the competition is fierce.

Leaders are emerging from unexpected places

Taxi companies that own no taxis, hoteliers that own no beds, and retailers that carry no inventory – the thing these companies have in common is being able to connect to customers and deliver what they require with an experience they are willing to pay for. Travelers' ability to view, review, consume, experience, and share has changed the travel industry, but airlines have been slow to react.

Leaders that are recognizing this phenomenon are embracing technology and its ability to connect their businesses to travelers. Examples are numerous, especially in the travel industry, including Uber and Airbnb. These companies are changing the industry and the way travelers approach travel.

Early adopters are winning

Research shows that companies that embrace the digital world and execute on their digital strategy are growing shareholder value faster than their peers.[2] Airlines that are leaders and innovators will leverage their competitive advantage and increase traveler loyalty, market share, effectiveness, and profitability.

Digital business models are disruptive. The rules have changed.

- **Airbnb** offers more rooms than many of the largest hotel groups in the world[3]
- **WestJet,** a Calgary-based low-cost carrier, came up with a successful marketing idea that had great effect on social sentiment: its 2014 Christmas miracle YouTube video has over 45 million views![4]
- **Skiplagged,** an app finding "hidden city" fares for cheaper flight tickets, created unexpected disruption in the market[5]
- **Seateroo** is bringing the sharing economy to air travel. Airline passengers may swap airline seats for payment. Seateroo supports every aspect of the market: order entry, negotiation, and electronic payments[6]

TODAY, EVERY BUSINESS IS A TECHNOLOGY BUSINESS

Keys for airlines to win in the digital economy:
- Lead reinventing and digitizing the business
- Digitize the engagement with travelers
- Partner with other market participants to achieve economies of scale

The digital economy and what it means for airlines

The world and people are connected like never before, and this certainly impacts the travel and airline industry. Leaders that recognize this phenomenon are embracing technology and its ability to connect their businesses to travelers.

Personalized traveler engagement
Today, travelers expect airlines to relate to them as individuals, understand their preferences and the context of their situational needs, and make relevant and beneficial offers. Only when these expectations are fulfilled, or even better, exceeded, will travelers stay loyal to the airline, become advocates, and trust the airline for services other than flights.

Airlines merchandising like retailers
A digital and mobile world changes the way travelers book travel. Airlines have learned from retailers and are adopting their approach with travelers. For the airlines that don't adapt, they risk simply being a supplier in the travel chain, leaving others, such as the Internet giants or new players entering this industry, to control the traveler conversation.

For example, the airline trade association (IATA) is driving an initiative called NDC (new distribution capability) that enables airlines to offer a richer, more personalized shopping experience to travelers, not only when selling directly, but also through their partners in the travel market.[7] Airlines cannot succeed by simply selling the service of flying a traveler from point A to point B. More and more, they need to offer travelers a choice of seat features, in-flight WiFi, food, extra luggage space, or the ability to book a hotel room, travel insurance, or shuttle directly on the airline's Web site.

Adopting a clear merchandising strategy is vital in order to have direct access to the traveler, but it's also vital in order to survive financially as ancillaries and partner products take an ever-increasing percentage of the overall revenues.

Intelligent operations
Intelligent operations requires having real-time visibility and the ability to optimize processes based on real-time data and smart algorithms, also using predictive models to prevent unforeseen disruptions. Unavoidable disruptions can be made less painful by leveraging digital technology to see the impact immediately and optimally reschedule passengers, flights, and crew.

Fuel consumption can also be minimized by optimizing refueling process based on Big Data and a mathematical model that calculates how much fuel should be uploaded at which airport. The model takes into account fuel prices, increase of fuel consumption based on higher weight because of the extra fuel carried, impact on maintenance of landing gear, brakes, tires, capacity and schedule of aircraft.

Proactive safety and maintenance
In the digital economy, maintenance, repair, and operations (MRO) and operational risk management will move from a plan/reactive to a predictive model. Airlines combine traditional airline maintenance techniques with the science of predictive maintenance, where sensor data is used to predict failures to optimize the maintenance program for maximum maintenance yield and aircraft availability.

Impact on finance
In finance, using digital capabilities allows a real-time and forward-looking approach, as there are no more data barriers between ticket sales, flight, transactional, and analytical data – projections can be made for the future and actions taken immediately.

Online travel planning: huge market potential

- Priceline.com, one of the leading online providers for online travel, continues rapid growth, with a 16% increase in gross profit for Q2 2016[8]
- Airlines with a higher proportion of ancillaries typically have better operating margins[9]
- The typical traveler uses 22 Web sites to research a trip, in multiple shopping sessions, before booking[10]
- A 2014 survey found that worldwide flight delays cost airlines $25 billion. About a quarter of all flight delays in the United States were caused by internal processes such as maintenance, cabin cleaning, loading, and refueling issues[11]

EXECUTIVE SUMMARY

Road map to the digital airline: Steps to digitize your business

REIMAGINING

Do you have the right strategy? The starting point of the transformation journey is to reimagine your business with business outcomes and travelers at the center.

REIMAGINE
BUSINESS MODELS

Changes in technology have a huge impact on distribution, traveler engagement, maintenance, operations, and safety. We see business models emerging where airlines expand their footprint and become door-to-door service providers, learning from retailers to differentiate with personalized relevant offerings and a model to become part of a network for data sharing in the area of predictive maintenance.

REIMAGINE
BUSINESS PROCESSES

Changing business models and digital technology drive business process efficiency and innovation that inspire new business approaches. We see this in the role of the airline industry, the emergence of new airline-controlled distribution and merchandising, and how travelers are engaged and operations are run.

REIMAGINE
TRAVELER ENGAGEMENT

The fundamental transformation from a flight-centric organization to a traveler-centric service provider and retailer will involve a lot more engagement with the traveler at a personalized level.

PLATFORM

Do you have the right platform?

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

SAP provides solutions aligned to desired outcomes. Our digital business framework is based on the five key pillars of a digital strategy:

1. **Superior traveler experience** across all channels
2. **Supplier collaboration** across all spend categories (maintenance, repair, services, and expenses)
3. **Core business processes** (finance, procurement, supply chain, and work management)
4. **Workforce engagement,** including employees and contractors
5. **Assets and the Internet of Things** to drive real-time insights and new business models

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

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

**Fundamental changes:** Five technology trends changing everything

We are witnessing an unmatched era of true business innovation. Breakthrough technologies have matured and hit scale together, enabling five defining technology trends:

HYPERCONNECTIVITY

1

Every person and every asset is connected, disrupting all the established rules around offering flights and services and running operations effectively. Connectivity drives airlines with collaboration between consumers, suppliers, information, assets, and the workforce.

SUPER COMPUTING

2
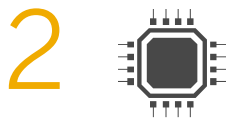
The limits of 20th century computing power are gone. The digital airline, powered by real-time in-memory computing, creates infinite business opportunities for the airline industry.

CLOUD COMPUTING

3

Technology adoption and business innovation now move at lightning speed. Travelers are inherently social, congregating on cloud platforms, freely sharing opinions and influencing behavior. The need for flexibility and speed when ramping up in new markets or channels highlights the role of cloud delivery in the airline industry.

SMARTER WORLD

4

Sensors, beacons, and predictive analytics are the new normal. Airlines use real-time data from the aircraft and predictive models to reduce unplanned maintenance and optimize operations and MRO.

CYBER SECURITY

5

Several recent massive, high-profile data breaches have put securing traveler and financial data at the top of the priority list for airline CIOs. Technology and proper governance are required for all data, interactions, identities, and business partners – any vulnerability could lead to catastrophe.

REIMAGINING

THE DIGITAL ECONOMY OFFERS INFINITE NEW 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.

DIGITAL INNOVATION IS REAL

Airlines reimagine their entire business to become – or remain – successful players in the digital economy. A successful digital transformation requires reimaging business models and processes as well as the traveler engagement.

REIMAGINE
BUSINESS MODELS

Airlines have to adapt to the digital world and transform to stay relevant and competitive. This requires embracing new business models, such as the retail, total journey, and platform provider models.

- **Retail model**: Distribution is changing, and airlines want to have more control of the products and services being sold. They are learning from the retail industry. Data enables airlines to interact differently with travelers, becoming more personal, contextual, and relevant, with offerings based on extensive, real-time traveler information.
- **Total journey model:** Attract customers to buy directly from the airline, thus owning more of the direct traveler interaction. Airlines must offer differentiating products and services, such as a complete experience packages from pickup at the customer's door, to transportation to events, hotels, and back to the airport.
- **Platform provider model:** Connect asset data from OEMs, operations, and service providers through the creation of a business partner collaboration platform for asset information sharing.

REIMAGINE
BUSINESS PROCESSES

Airlines are leveraging digital technology for new or enhanced business processes. The following are reimagined and digitally empowered business processes from across the future value chain.

- **Enhanced e-commerce** to make purchases on Web sites easy, pleasant, and personally relevant
- **Improved travel experience at the airport** to limit inconvenience and create loyalty
- **Automated procurement** of duty-free items, flight amenities, and other materials
- **Real-time financial insights** will change the way decisions are made at airlines, as the impact of these decisions is more clearly seen in the overall organizational context
- **Optimized disruption management** to minimize the impact of disruptions with regards to traveler satisfaction and costs
- **Responsive inflight operations** to increase the traveler's comfort and differentiate from other carriers to create brand value
- **Predictive maintenance and safety:** Monitor sensor data to analyze and predict asset malfunctions

REIMAGINE
TRAVELER ENGAGEMENT

How airlines evolve traveler engagement, incorporating technology in a meaningful way, will be a main differentiator in a very competitive environment and the very essence of survival in the digital age.

- **Personalized, contextual, relevant engagement** from imagination to destination and back home, always based on traveler profiles and preferences. Make relevant offers at every point during the traveler journey, fulfilling the traveler's needs at each specific time and location, leveraging all touch points
- **Consistent engagement** independent of channel or touch point – always up to date, always a consistent traveler experience with a look and feel that fulfills expectations
- **Social media and social sentiment** to interact with travelers to build brand engagement, initiate booking, up-sell and cross-sell, and provide service
- **Frictionless passenger experience** via self-service and day-of-travel disruption management
- **Personalized pricing** allows airlines to be much more dynamic in their offerings

REIMAGINE BUSINESS MODELS

Traditionally, airlines have supplied flights to the market, booked mostly through global distribution systems, sold mostly by travel agents, and OTAs with little influence from the airline. With digital technologies playing a larger role, many new business models fundamentally rethink the use of technology by creating new sources of value for the traveler and finding creative ways to monetize that value.

Retail model

Traveler behavior has changed dramatically when it comes searching for a flight or trip and then bookings travel. Airlines want to become retailers – they must make offers that are personal, contextual, relevant, and seamless, regardless of the touch point or device. They need to know their travelers and capture as much information as is available from internal interactions and social media data and then leverage this data to make useful offers at the moment and location where they are most relevant.

This retail approach is vital in order to have direct access to the traveler, but it's also vital in order to increase revenues with ancillary products, partner products, and merchandising. Technological capabilities enable this process.

Total journey model

Distribution is changing as the digital world requires new ways of selling. Powerful new digital players are entering the travel market. Airlines want more control of the products and services they offer – whether they sell directly or indirectly – but mostly they want to attract more travelers to buy directly from them and own the traveler "conversation." Therefore many airlines provide a lot more than the flight from point A to point B; they offer a door-to door experience with chauffeur pickup, event tickets, hotels, and everything around an enjoyable trip and unique experience.

Platform provider model

Next-generation airplanes will be equipped with thousands of sensors.
- Airbus A380-1000 has 10,000 sensors (in each wing!)
- Airbus A350 has 6,000 sensors producing 2.5Tb of data per day
- Boeing B787 produces over 500GB of data per flight

These sensors measure health and performance and provide new insights into performance that could save millions on fuel and, more importantly, save lives by improving safety.

Airplane data could be more easily accessible through improvements in connectivity. This would allow the data to be presented on a central process platform, which alters the way the airline operator performs maintenance and services. When combining this platform with the right analytical systems, airlines have discovered that data can be used to eliminate inefficiencies due to redundancy, predict routes their passengers are likely to need, and improve safety.

This platform provided by the maintenance service organization would be an integrated, comprehensive solution that optimizes asset visibility and health and customer services. It also enables real-time visibility into the condition of the asset by measuring, predicting, and alerting when incidents occur. To do so, the platform links asset data to an intelligent asset network that provides performance benchmarking, up-to-date service document-tation and real-time visibility of spare part replacement. The platform also connects asset data from OEMs, operations, and service providers through the creation of a business partner collaboration platform for asset information sharing.

This changes the way operators and maintenance service providers think about performing maintenance. The maintenance methodology changes from time-series events to on-condition-based maintenance, thereby increasing the airplane's uptime.

Ryanair wants to become the "Amazon of travel": Ryanair CEO, Michael O'Leary, says the carrier is set to offer hotel bookings and TripAdvisor-style reviews[12]

14,000%: Increase in airplane data generation from 2010 to 2030[13]

REIMAGINE BUSINESS PROCESSES

> In the digitized world, we will see a lot of changes that impact the complete passenger experience, the way products and services sold, as well as many other processes within airlines – from disruption management to maintenance.

Enhanced e-commerce

Airlines have learned from retailers how to sell their products and services on their Web sites or apps. Users have high expectations with regards to the purchasing experience – it needs to be mobile easy, quick, and enjoyable. Additional offers, such as premium food, more leg room, or hotel rooms, must be personalized and relevant.

Improved travel experience at the airport

Digital technology can do away with long lines at airports for identification, boarding pass check, or check-in. Airlines will make navigating through the airports easier. Automatic recognition, sensors, and real-time, relevant communication can make the experience a lot smoother.

Dynamic, contextual, personalized pricing

Airline pricing will evolve to a much a more dynamic model, where an airline can decide how targeted prices are – down to a personalized price – dependent on various factors, such as traveler profile, time, and context.

Automated networked procurement

Reordering of duty-free items, flight amenities, uniforms, or other materials will be triggered automatically. Duty-free items can be ordered ahead of time by passengers and delivered to them during their return flight. Stocks will automatically be updated. Suppliers and the airlines will be closely linked in a network.

Real-time insights in finance and sales

Airlines now have the tools that provide seamless integration to revenue accounting and reservation systems and real-time insight into sales data.

Airlines will have total visibility of indirect and direct costs as they occur from flight to maintenance.

Optimized disruption management

Disruptions are painful situations for travelers and the airline. In a digital world, all relevant data is available in real time, and the impact of a disruption can be minimized by either taking measures before they occur or optimizing the rescheduling of aircraft and crew and the rebooking of passengers. Travelers will be informed proactively via app or other relevant touch points, such as the flight crew.

Responsive inflight operations

The flight experience itself is a great way for an airline to differentiate. Airlines invest money to provide onboard technology and processes to make the flight more enjoyable – from customized features that can easily be selected during booking, to an intelligent aircraft cabin environment that reacts to passenger needs during the flight.

Predictive safety and maintenance

In predictive maintenance, the idea is to go from root-cause analysis, to fault pattern recognition, to machine health prediction, to automated service. The transparency and the actionable insights enable the airline to make proactive decisions for improved services, leveraging real-time analytics on mass volume asset data. This helps airlines predict failure based on confidence and risk levels, identify trends in health indicators for assets, and predict the optimum time at which inspection/maintenance should be planned, based on trends in historical failures, age, utilization, environment, and other parameters.

KLM's "Happy Flow" aims to revolutionize the airport process and uses facial recognition technology as the basis of a single passenger token, removing the need for passengers to present their passport and boarding pass at multiple stages of the airport journey.[14]

Airline Web sites will produce 59% of booking volume by 2017, up from 35% in 2012.[10]

REIMAGINE TRAVELER ENGAGEMENT

> The fundamental transformation from a flight-centric organization to a traveler-centric service provider and retailer will involve a lot more one-to-one engagement with the traveler at a personalized level.

Personalized, contextual, relevant engagement from before the journey begins until after it's over. This kind of engagement can only be based on real-time access to a traveler profile, including personal preferences, past history, social media information, value to the airline – or any information available or openly shared by the traveler. Having access to this traveler data in real time at every touch point is key for making relevant offers at every point of the traveler journey and fulfilling the traveler's needs at each specific time and location.

Touch points could be a social media platform, the airline's Web site during booking; e-mail; check-in via mobile app, the counter, or the gate the gate; interaction with crew during flight; the inflight entertainment system; airport transit; and so on.

Airlines need to be creative if they want to differentiate themselves through innovative personalized offers to increase traveler satisfaction and loyalty.

Consistent engagement is essential, independent of channel or touch point, always up to date, always a consistent traveler experience with a look and feel that fulfills expectations. Travelers' expectations are high, and they want a simple, easy-to-use, and fast interface with the airline. Consistency is a must.

Social media and social sentiment are an important platform to use to interact with travelers to build brand engagement, initiate booking, up-sell and cross-sell, and provide service. It's also vital to keep track of what's being communicated about the airline and react in time to minimize the impact of bad individual experiences.

Frictionless travel with increased **self-service, communication,** and **automated recognition –** this is especially important for frequent flyers and business travelers who don't want to be bothered with standing in line. Convenient self-service across various channels, wherever possible, and using technology to make identification automatic and seamless are a big plus. Proactive communication about luggage, gate changes, delays, disruptions, etc. are also expected.

Personalized pricing: Pricing will change into a more dynamic, real-time model based on the data input – even down to a personalized contextual price.

Socially active airlines generally garner a much more positive reputation than those that are less active.[15]

Airlines are considering "personalized pricing," which is charging each consumer a unique price for airfare based on a combination of seat availability and a consumer's personal characteristics.[16]

SAP HANA: THE GREAT SIMPLIFIER

At the heart of a digital business is the agility and flexibility 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 airline business models and traveler engagement by leveraging the five technology trends

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: Bringing together transactions and analytics on the same platform. Uniting structured data (e.g., finance) and unstructured data (text, video, voice) will change the way airlines 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 the airline and travel industry validates its massive potential for digital businesses.

With in-memory computing, we can now finally:
1. **Leverage Big Data** from meters, sensors, weather, social, and geospatial sources. Bringing all data signals together leads to the optimum recommendation, which can be instantly acted upon in transactional systems via human and machine-to-machine interfaces
2. **Extend the business process** to interoperate with business partners in near real time with advanced cloud-based business networks
3. **Modernize business processes** from finance to supply chain, MRO to traveler service and marketing, 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 costs, and providing the agility required in 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 HANA PLATFORM
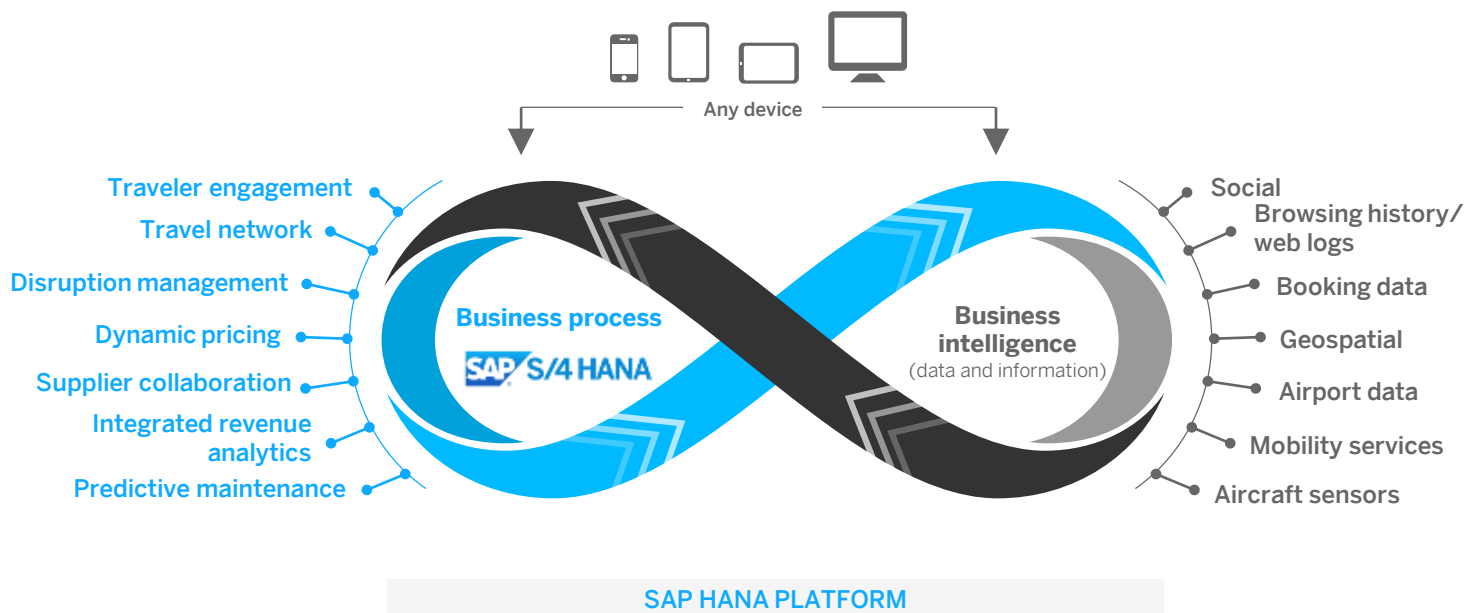
DIGITAL BUSINESS FRAMEWORK

A SIMPLE AND PROVEN APPROACH TO VALUE CREATION THROUGH DIGITIZATION

Every airline requires a simple digital approach to build a pragmatic and executable vision of its digital strategy
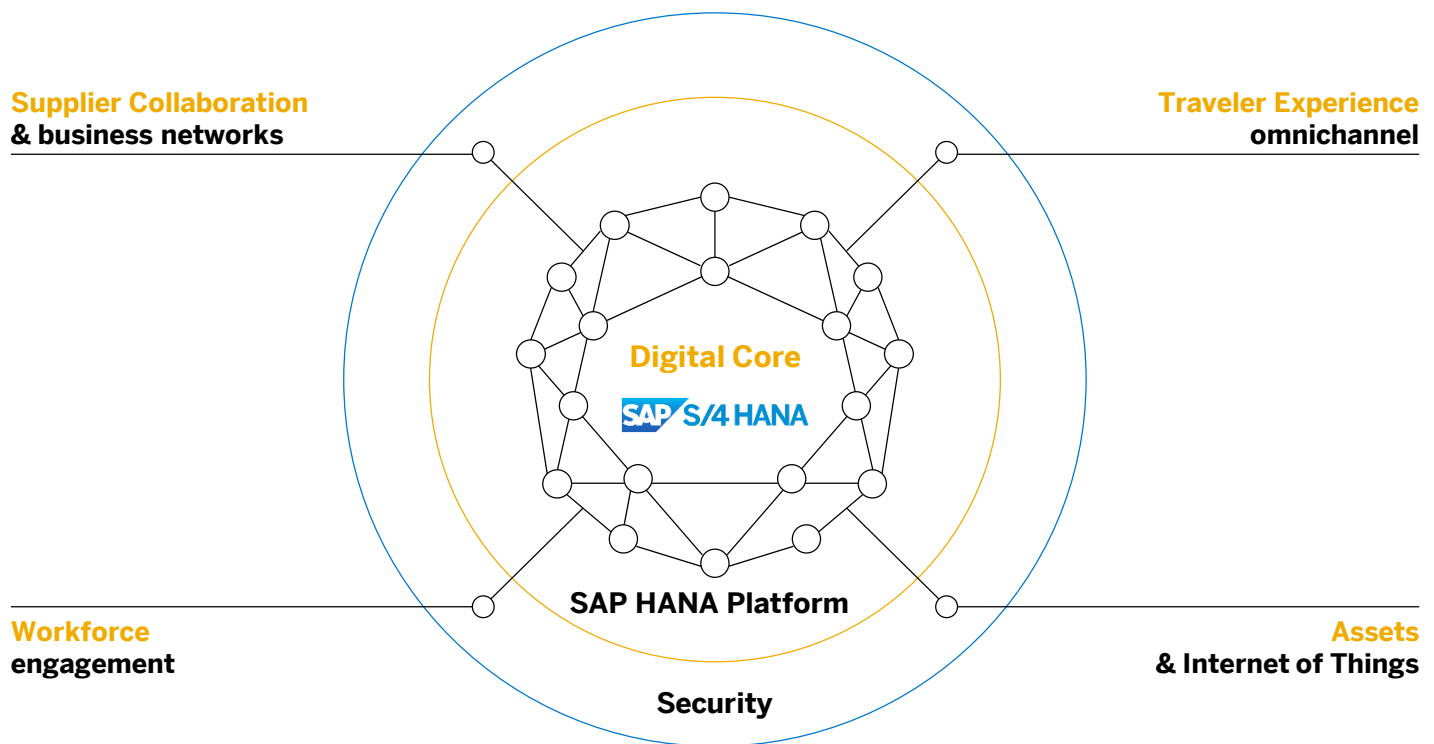
DIGITAL BUSINESS FRAMEWORK

Every company needs to think about the five pillars of digitization
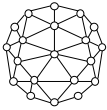
SAP understands the five pillars of digitization, and we also understand that continuously changing requirements pose big challenges for businesses. Reimagining business models, business processes, and traveler engagement helps in developing the digitization road map.

We have built a structured framework to develop and execute on airline digital enterprise strategy: the digital business framework. The digital core is the platform for innovation and business process optimization, connecting the workforce, the Internet of Things, the supply network, and travelers.

1. Outcome-based **traveler** engagement across all physical and digital channels
2. Smarter and engaged **workforce** across all employees and contractors
3. **Supplier** collaboration to accelerate growth and co-innovation
4. **Internet of Things** and **Big Data** to drive real-time insights and enable new business models
5. **Core business processes** that connect transactions and analytics in real time to run smarter, faster, and simpler

Supplier Collaboration
& business networks

Traveler Experience
omnichannel

Digital Core

SAP S/4 HANA

SAP HANA Platform

Workforce
engagement

Assets
& Internet of Things

Security

THE DIGITAL CORE FOR AIRLINES

A new generation of ERP solution, running in real time, integrating predictive, Big Data, and mobile, will change how airlines work, how they run their businesses, and how information is consumed – the future is here.

With advanced in-memory computing, you can finally free yourself from running the business in batch mode and building complex procedures to get around technology limitations. You can Run Simple and unleash the full power of the digital business.

Real time
Real-time optimization of business-based changes will have a massive implication for how we work, how we do business, and how we organize.

Power of prediction and simulation
Every employee can gain real business insights with the help of simulation and predictive tools to drive smarter decisions and significantly improve productivity, traveler loyalty, and profitability.

Agility
The ability to rapidly enter new markets, adopt new business models, or reflect an organizational change in one-tenth of the time it takes with today's systems will yield the agility required in the digital economy.

Deployment choice and lower TCO
Accessing solutions to run the core has to be simple. Airlines now have the choice to deploy in house or in the cloud. In-memory computing also has a significant impact on TCO, and it will free up funds for infrastructure investment.

Consumer-grade user experience
User experience is key to accepting digital change. It drives adoption, user engagement, and people productivity.
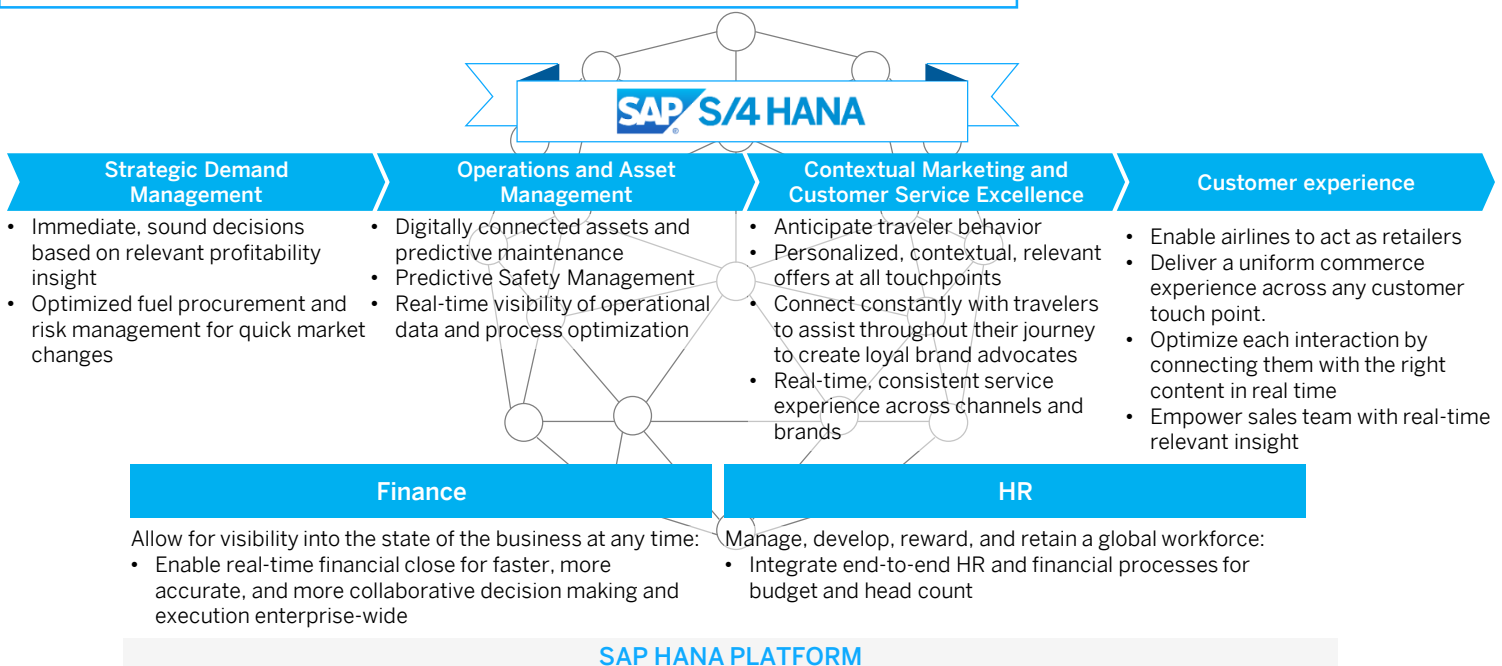
Simplify with SAP

SAP S/4HANA is the only end-to-end solution that covers all business processes and runs in-memory. The real consideration here is how and when do you use such a breakthrough in business applications.

In addition, the SAP HANA Cloud Platform can be the single enterprise data source for SAP S/4HANA and the rest of your solution landscape.

Bangkok Airways Public Company Limited
"We want to provide our travelers with the best experience, not only in flight, but also from booking to arriving on the ground at the destination. SAP Business Suite powered by SAP HANA will definitely help us achieve our goals."[17]

Strategic Demand Management	Operations and Asset Management	Contextual Marketing and Customer Service Excellence	Customer experience
• Immediate, sound decisions based on relevant profitability insight • Optimized fuel procurement and risk management for quick market changes	• Digitally connected assets and predictive maintenance • Predictive Safety Management • Real-time visibility of operational data and process optimization	• Anticipate traveler behavior • Personalized, contextual, relevant offers at all touchpoints • Connect constantly with travelers to assist throughout their journey to create loyal brand advocates • Real-time, consistent service experience across channels and brands	• Enable airlines to act as retailers • Deliver a uniform commerce experience across any customer touch point. • Optimize each interaction by connecting them with the right content in real time • Empower sales team with real-time relevant insight

Finance	HR
Allow for visibility into the state of the business at any time: • Enable real-time financial close for faster, more accurate, and more collaborative decision making and execution enterprise-wide	Manage, develop, reward, and retain a global workforce: • Integrate end-to-end HR and financial processes for budget and head count

SAP HANA PLATFORM

TRAVELER EXPERIENCE

Digital technology has **changed the game,** but travelers **changed the rules.** Travelers demand simple, seamless, personalized experiences across **any channel, anytime, anywhere, and on any device.**

Three key trends are reshaping the traveler experience:

Outcome economy

The outcome economy requires a deep change in the airline business model and new organizational and business process capabilities. Airlines are changing from service providers selling tickets to fly from point A to point B to hybrid retailers that cover the whole end-to-end traveler journey, selling any relevant service that provides value to travelers.

Travelers' journey

Travelers choose their own journey and multiple channels at their convenience. It's important to provide a consistent experience across all channels and leverage every touch point along the journey, whether Web site, mobile app, call center agent, or check-in kiosk.

Big Data and marketing in near real time:

Big Data allows airlines to sense and respond to travelers' needs in real time and make relevant, personalized, and contextual offers at every touch point. With the proliferation of traveler-owned connected devices, the data volume is expanding by orders of magnitude, giving rise to new business opportunities.

Digitize your end-to-end traveler experience with SAP

SAP offers a single platform that brings together marketing, sales, services, and commerce (including the SAP Hybris solutions) to ensure seamless digitization of the entire traveler experience. SAP solutions for traveler engagement and commerce powered by the SAP HANA platform enable a 360-degree view of your traveler, real-time interaction, and sophisticated, predictive analytics, providing deep insights into your business.

- **Orchestrate business processes** across marketing, commerce, sales, and service
- **Deliver personalized experiences** in context with each interaction – making every interaction valuable, because it's based on your **knowledge** about the traveler's preferences and situational needs
- **Create a single, harmonized experience** for your traveler while reducing the burden on employees
- Be prepared to **engage your travelers on the channels they choose** at any moment in their journey
- Offer relevant services for travelers' **complete end-to-end journey** in an easy-to-use way, increasing profitability by adding ancillaries and partner products to your portfolio

The customer-centric airline

"Forward-thinking airlines are already moving to the next level by defining new standards of traveler service based on customized individual services targeted at traveler needs. Yet many new opportunities remain to exploit emerging technologies."[18]

56%
Higher conversion rate of organizations that evaluate how sales and marketing initiatives drive revenue and pipeline.[19]

15%
Faster response time where agents have access to service history and other traveler information.[19]

68%
Of U.S. travelers are willing to pay more for a better traveler experience.[20]

-32%
Marketing spend where there are data-driven marketing processes and decision making.[19]

SAP HANA PLATFORM

WORKFORCE ENGAGEMENT

The world is getting **smarter** in the digital economy. But **complexity is overwhelming the workforce** in this pursuit.

Complexity is the enemy of workforce engagement. People are working harder than ever but are not necessarily accomplishing more. Often workers do not have access to smart, consumer-grade technology to work faster, better, and more efficiently. A large portion of airline employees are working in airports or actually flying. They need mobile accessibility and easy-to-use access to all information. Four forces need to be addressed:

Changing of the guard
Over 50% of the workforce will be from the millennial generation by 2020.[21] Airlines have to devise a workforce strategy to make work in this industry attractive for the digital generation.

Contingent labor is on the rise
Airlines are turning more to contractors and service providers to drive agility and lower fixed costs. Airlines can outsource work, but not the responsibility for safe and compliant operations. The contingent workforce must be digitally integrated in all business processes.

Constant reorganization
Reorganizing to adjust to the new reality is becoming a constant affair and can't disrupt efficient operations.

Complexity is on the rise
The role of the airline is changing. Service offerings are becoming more broad, and regulations are changing by the day.

Improve your total workforce productivity: Simplify with SAP

Digitize your workforce with SAP: SAP S/4HANA + SAP SuccessFactors solutions + SAP Fieldglass solutions + SAP Fiori provide the tools for total workforce engagement and advanced analytics.
- **Attracting the best people –** Recruit and onboard the best workforce, simplify their work, and ensure that regulatory and compliance requirements are met
- **Managing the total workforce lifecycle –** Manage the total workforce lifecycle from recruiting to onboarding, performance, compensation, and learning – all in one place
- **Smarter apps with greater user experience –** With so many employees not working at a fixed location, it's vital to enable them to easily access the right information across any device and through a dramatically simplified user experience

EMPLOYEE LIFECYCLE
Recruiting/onboarding
Performance and goals
Succession and development
Compensation
Employee record and payroll
Travel and expense
Workforce analytics
Learning

SAP SuccessFactors

SMARTER APPS WITH IMPROVED USER EXPERIENCE
Contextual
Intuitive
Adaptive and predictive
Anywhere/anytime
Secure

SAP Fiori

FLEXIBLE WORKFORCE LIFECYCLE
Recruiting/onboarding
Time and expense
Invoicing/payment
Statement of work
Performance management
Workforce analytics

SAP Fieldglass

Workforce will double
"The size of the commercial aviation workforce is expected to almost double by 2032. Coinciding almost perfectly with large-scale retirements of prior generations and the industry's recent financial instability, many aviation businesses already are struggling to attract and retain qualified staff."[22]

Simplicity needed
"Cost reduction can also be achieved through enhancements in organizational structure, operating model, and work practices. In particular, legacy airlines have often built up complex processes over decades that cost far more than the streamlined processes of the Low Cost Carriers (LCC's)."[23]

Over 70%
of airlines will provide mobile service to operational staff by 2016.[24]

41%
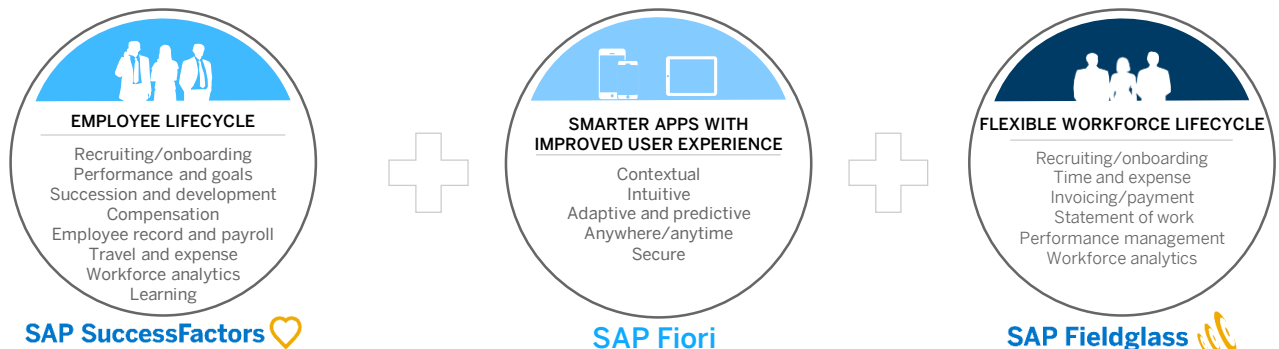Increase in **contingent workforce spending** in the past five years[25]

30%
Of executives say their companies give special attention to the particular wants and needs of millennials.[26]

BUSINESS NETWORKS AND SUPPLIER COLLABORATION

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.

Collaboration across all spend categories will change the nature of how airlines acquire products and services, outsource, and drive value creation across the entire value chain. Several trends are redefining the game:

Business connectivity at scale
When airline suppliers small and large are connected, the transactional platform becomes the de facto standard. This is already a reality (examples: Ariba, Concur, Alibaba)

B2B collaboration by category
Acquiring products, services, or managing expenses requires a set of open standards and a different community of suppliers. Those standards are now set and operational.

User experience
Without a better user experience at work (examples: Amazon, Travelocity, Google), employees will work around the system, negating the value of negotiated contracts and driving maverick spending.

Network of networks
Airlines are looking at end-to-end services like digital payment and invoice processing, travel booking and expense settlements, supplier certification, global business yellow pages, etc. This is all possible as business networks like the Ariba Network are aggregating services into a one-stop shop.

Supporting growth
"SAP Ariba solutions will support our extraordinary growth by more effectively tapping into the global business network and standardizing our purchasing processes. They will offer enormous value to our suppliers and our guests while allowing us to control spending, collaborate with suppliers, and minimize risks."[27]

3,000
Suppliers onboarded including tracking and assessment for key supplier performance metrics [28]

25–50%
Of travel bookings are "out of compliance" with limited corporate control or visibility[19]

50%
Highly networked enterprises are 50% more likely to experience market share gains and higher profit margins than un-networked peers.[29]

50–75%
Faster transaction cycles are being achieved with the Ariba Network.[30]

Simplify supplier collaboration with SAP Business Networks

SAP S/4HANA gives you incredible capabilities to digitize business processes, and the connectivity to the network allows you to extend those processes beyond the four walls of your business.
- **Solution already at scale** and cover all spend categories (direct and indirect material, labor and services, travel and expenses).
- **Business networks operate on a global basis,** meet data security standards, and operate with near zero downtime
- **Airlines can become part of the supplier network** for direct bookings by business travelers by joining the Concur network
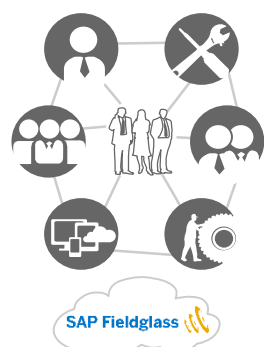
Manage expenses and offer flights directly

Direct and indirect material

Labor and services

CONCUR

SAP Ariba
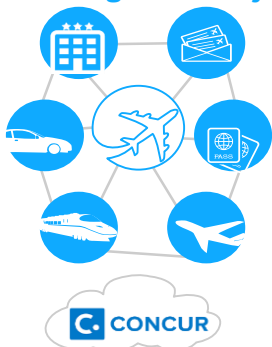
SAP Fieldglass

ASSETS AND THE INTERNET OF THINGS

The most **dramatic change** in the digital economy will be driven by hyperconnectivity and Big Data science. These will **transform nearly every airline business model.**

Airlines understand the potential of leveraging the Internet of Things in order to improve traveler experience and operational efficiency. We are witnessing new use cases across airlines with breathtaking results.

Improved travel experience
Sensors and beacons are used more and more to identify travelers at all touch points, help them navigate to their destination, and make their flight connections easier. Travelers will be much better informed throughout the journey.

Baggage tracking
Baggage drop and reclaim, tracking of baggage or in-transit pets are areas that will be greatly impacted by the Internet of Things (IoT).

Inflight automation
Sensors will be used to automatically adjust the cabin environment, temperature, and air quality. Catering and duty-free trolleys will be tracked, and the restocking of duty-free items could be automated and optimized.

Increased operational efficiency and lower fuel costs
Airlines are using aircraft data combined with external data to optimize their flight operations and lower fuel consumption – but also to lower overall fuel costs by optimizing fuel procurement or hedging.

Predictive maintenance
Sensors on the aircraft continually feed a central system where, based on analytical models, impending failures can be predicted and action taken before the aircraft is grounded, thereby minimizing cost and maximizing aircraft availability and traveler satisfaction.

Less lost luggage
Since 2011, Delta Air Lines has enabled its customers to keep a virtual eye on their luggage throughout the journey via its mobile apps.[31]

Remote monitoring
Emirates is currently piloting beacons to track engineering assets, such as toolboxes, and to monitor the condition of equipment, such as life jackets, without necessarily having to physically inspect them.[31]

~4 billion
Mobile Internet users and an expected 30 billion connected devices by 2020[32,33,34]

80%
Of companies that invested in IoT increased revenues [35]

Connect, transform, and reimagine with SAP

With SAP HANA, Internet of Things edition, airlines can now take embedded device data, analyze this data into information in real time, and apply this information across the value chain to drive business insights and create new business models.

SAP Internet of Things Platform
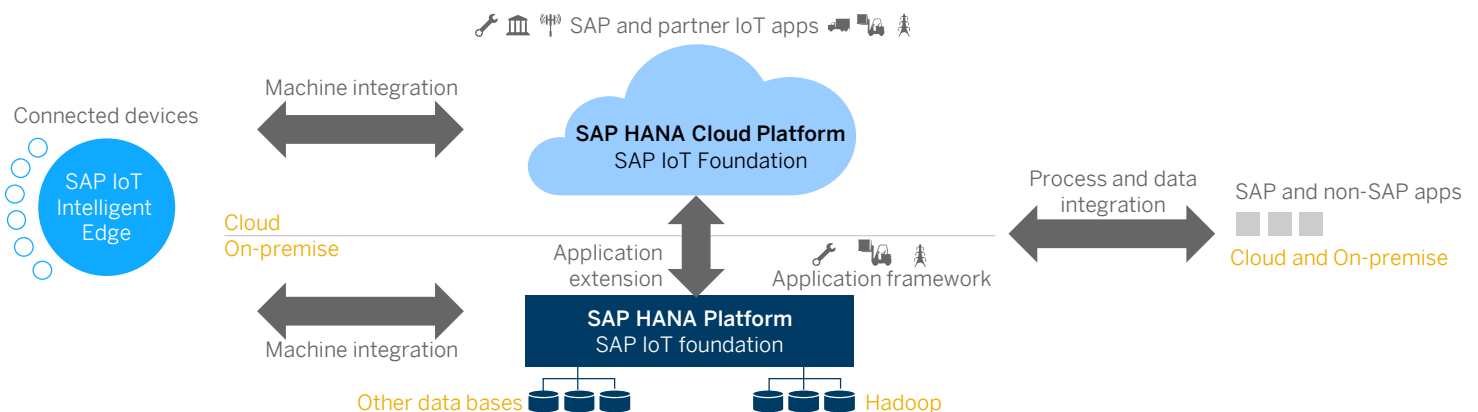
SAP HANA PLATFORM – A NEW COMPUTING PARADIGM

SAP HANA is the ultimate simplifier and the platform for innovation and digital business

Dream, develop, and deliver with SAP HANA Cloud Platform

SAP HANA Cloud Platform gives airlines the mobile, collaboration, integration, and analytic capabilities you need to dream big, develop fast, and deliver everywhere, with the following capabilities:

Application extensions
Extend your current cloud and on-premise solutions for optimal operational excellence throughout the airline value chain.

Real-time analytics
Engage travelers, optimize business processes, and unleash new revenues with real-time analytic apps, powered by SAP HANA.

New cloud apps
Quickly build innovative, intuitive industry apps for today's always-on, mobile, social, and data-driven world.

Extended storage capabilities
Holistically manage all structured, unstructured, and infinite data streams with flexible combinations of data stream processing, in-memory technology, disk-based columnar storage, and Hadoop-based storage solutions.

Data footprint reduction
Significantly reduce memory footprint and TCO. In ERP systems, we have seen ~6x reduction by SAP HANA's dictionary compression. Removing aggregates and actual and historical data separation further reduces the footprint to ~10x.

Spirit Aerosystems
"Think about the art of the possible – what's a problem you can't solve – a 10 or 50 million dollar problem? ... How can you apply the SAP HANA technology to solve it? That's the real return."[36]

Awash in data
"Airlines are awash in data, much of it unstructured. But only recently have airlines been able to use Big Data techniques to solve, among other objectives, how to recognize and enhance traveler value."[37]

Use the data
"Airlines have always been very good at collecting data, but they haven't always been good at using it."[37]

The SAP HANA platform is...

Real-time, in-memory platform • 10x data footprint reduction for ERP • Extended storage, including Hadoop • Open architecture • Developer-friendly • Embeds mobile and analytics • Secure • Cloud-ready

The following architecture highlights this unique solution and how it changes the art of the possible.

New apps and services	NEW APPS	EXTENSION		INTEGRATION
	Open programming containers (Java, XS2)			
Platform	UX (Mobile/SAP Fiori)	Analytics (SAP Lumira)	Integration (SAP HANA Cloud Integration)	Security (Single sign-on, Identify)
	SAP HANA			
	Data platform (SAP HANA DB, SAP ASE)	Libraries (graph, predictive)		Big Data (Hadoop, Spark)
Infrastructure	Infrastructure delivery			
	SAP data centers	Partner data centers	Customer data centers	Elastic deployment

HOW DOES IT ALL COME TOGETHER? – EXAMPLE

Each of the five digital business pillars delivers individual business value, but next-generation business processes will span multiple pillars to drive efficiency internally or across the business network, connect to devices, and improve asset health and performance.

USE EQUIPMENT PERFORMANCE DATA TO PROACTIVELY MAINTAIN AIRCRAFT
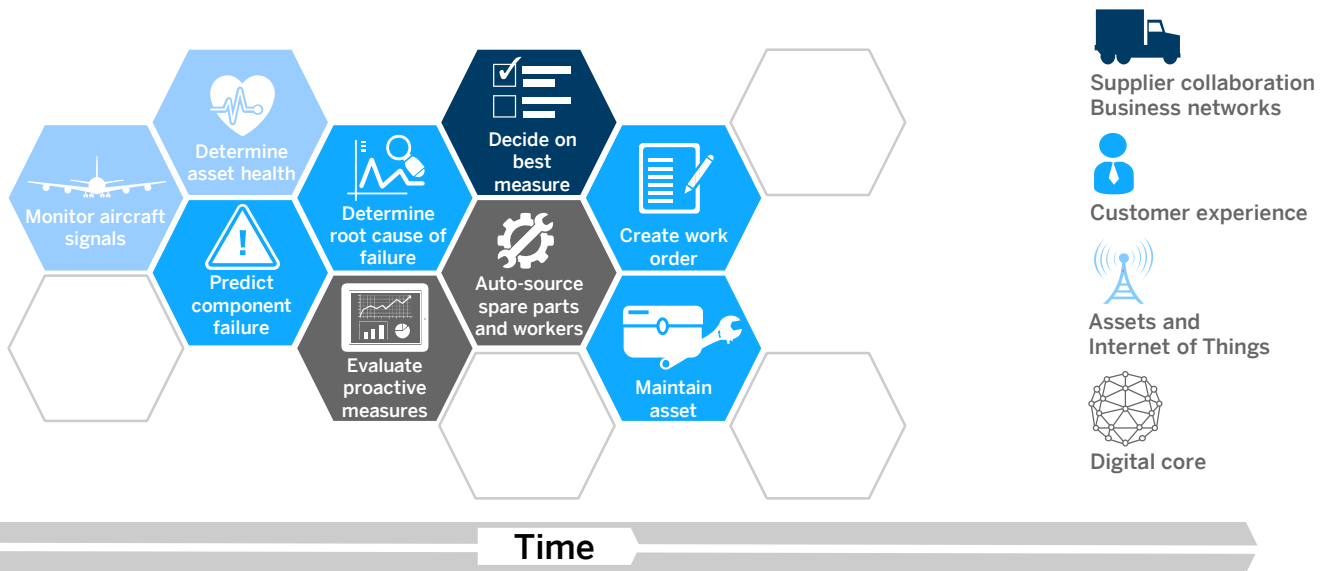
Imagine that data from sensors on the aircraft – both telemetry data (temperature, vibration, pressure, etc.) and fault codes – is continuously collected and analyzed in real time to determine and monitor asset status and health. This information is also fed into advanced analytics models that can predict impending failures based on algorithms running in the background early enough to avoid unplanned aircraft down-time (AOG).

To evaluate the proactive measures, the system needs to determine potential root causes for an expected failure. This supports the decision for the best actions, including ordering the right spare parts, assigning the right experts, and devising a cost-effective schedule.

When impending failure is predicted, the system automatically triggers maintenance notification with appropriate spares in the central system (automatic connection to logistical events that will correct failure). Labor and facility resources are optimized to ensure high priority requirements are given the appropriate attention and maintenance costs are minimized. Material demand for needed spares is automatically sourced and fulfilled to ensure the part arrives at the point of demand when it is required. RFID speeds the fulfillment process through the warehouse and provides visibility across the transportation route.

Material requirements that are not available in-house are automatically sourced from the supply network. 3D visual images can then be used to provide visual work instructions, which speeds repair and ensures the correct procedures are followed.

Work order metrics (labor and material costs, time, etc.) are automatically collected and provided in real time to managers via mobile devices to report whether aftermarket service profitability and aircraft availability contract metrics are met.

Real-time equipment monitoring yields tangible business benefits:
• Increased safety and availability of equipment
• Increased reliability
• Increased maintainability
• Reduced risk and increased profitability executing against outcome-based contracts

Every aircraft on ground and flight delays due to unforeseen maintenance that can be prevented or proactively managed minimizes cost and maximizes aircraft availability and traveler satisfaction.

HOW TO START

THE JOURNEY TO THE DIGITAL
AIRLINE BEGINS WITH A
CAPABILITY ANALYSIS THAT
RESULTS IN THE
TRANSFORMATION AGENDA

HOW TO START

THE JOURNEY TO THE DIGITAL AIRLINE

The journey to define future business models capitalizing on the digital economy involves all disciplines of a modern airline and requires a systematic approach to identify and capture business opportunities.

THE COLLABORATIVE VALUE AND INNOVATION FRAMEWORK

Airlines embarking on the transformation journey to the digital business typically start to reimagine their business with focus on business outcomes and travelers.

Answering the key questions, "What role do we want to play in the travel market?" and, "Are there new ways of making money?" will provide the direction for reimagining your business processes and operational model.

For innovation today, a new level of collaboration is required. As a result, we have developed a framework that will be a continuous and holistic partnership model designed to drive true collaboration and engagement. Outlined below are the five steps of SAP's collaborative value and innovation framework:

1. Strategy alignment: Understand company and SAP strategic direction and identify initiatives

2. Opportunity assessment: Opportunities deep-dive based on strategic initiatives and prioritization based on value

3. Solution road map and ROI: Document end-state solution, business case – benefits, TCO, and ROI – and strategic road map

4. Value realization: Deliver transformation on time, on budget, and on value

5. Governance: Maximize investments and accelerate value creation with governance based on executive engagement, value delivery, and continuous innovation
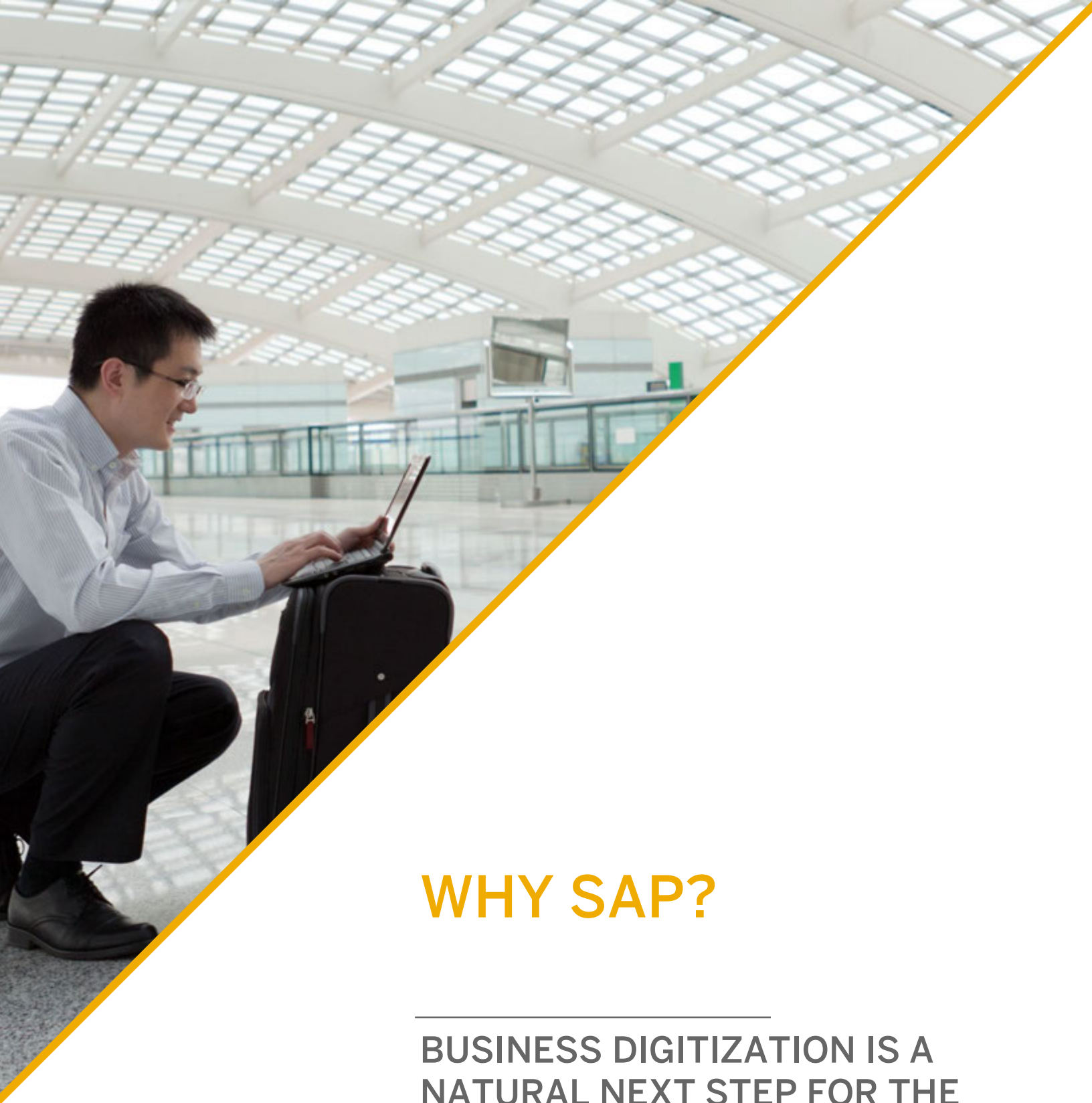
WHY SAP?

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 IS COMMITTED TO INNOVATION

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

GLOBAL PRESENCE AND RELEVANCE	INDUSTRY AND LOB FOCUS	DIGITAL ECONOMY - READY	INNOVATION LEADER	DIGITAL AIRLINE ENABLED BY SAP
• **80K employees** representing 150 nationalities • **320K customers** • SAP operates in **190 countries**	• Solutions for **25 industries and 12 lines of business** • **98% of top valued brands** are our travelers • **76% of the world's transactions** are managed on SAP	• **110 million** business cloud users • **2.2 million connected** businesses • **$820 billion+** in B2B commerce • **99%+ of mobile devices** connected with SAP messaging	• 2011 **SAP HANA** launched • 2012 **SAP Cloud** launched • 2014 **SAP business networks** are the largest marketplace in the world • 2015 **SAP HANA Cloud Platform** • 2015 **SAP S/4HANA:** Most modern ERP system	• **87% of the airlines** in the Forbes Global 2000 are SAP Customers • **10 of 10 safest airlines** in the world run SAP solutions • **1.7 billion+** of the world's travelers are transported by SAP customers

Working with Ariba has been instrumental in helping British Airways realiz**e its cost saving objectives** and demonstrating the critical role procurement can play when industry revenues are down. British Airways was able to **process 80% of its purchases electronically** and **achieved a 40% reduction in transaction costs.**[38]

Bangkok Airways is deploying SAP Business Suite powered by SAP HANA. Now with **integrated and improved internal processes,** Bangkok Airways can **offer customers mobile communications for flight changes and other digital services, all in one place.** With **real-time insight** provided by its SAP HANA engagement, Bangkok Airlines now analyzes its data to **strategically trim unnecessary costs.**[17]

"From procurement to HR, SAP is allowing Etihad Airways to run live and run simple."[39]

Traveler
Experience Omnichannel

Supplier collaboration
Business networks

Digital core

Workforce
engagement

Assets &
IoT

SAP Hybris
SAP Cloud for Customer

SAP Fieldglass
CONCUR
SAP Ariba

SAP S/4 HANA

SAP Fieldglass
SAP SuccessFactors
SAP Fiori

SAP HANA
Cloud Platform
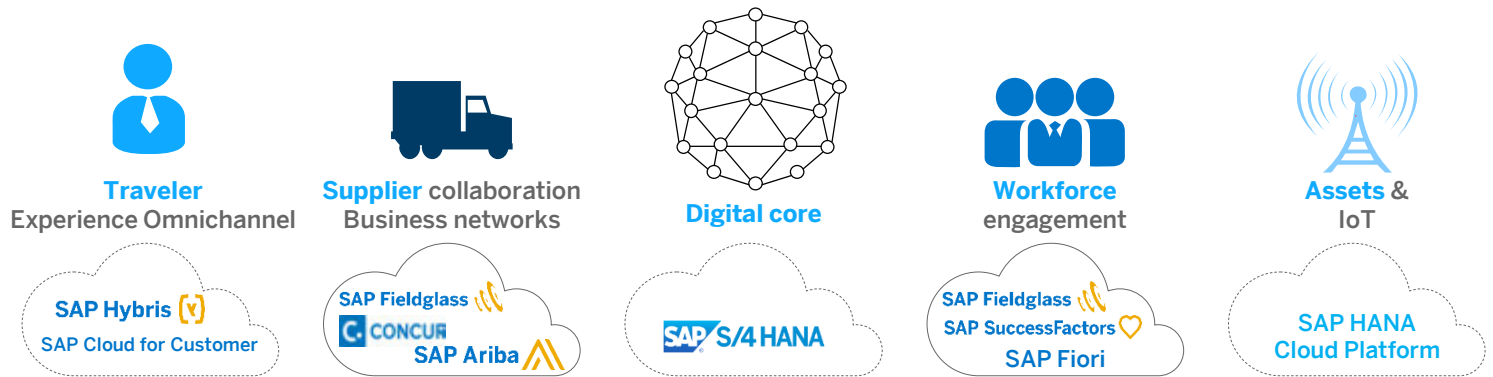
SAP will bring the simplification, innovation, and acceleration required to support the development of your digital business strategy. These capabilities will be leveraged throughout SAP's collaborative value and innovation framework.
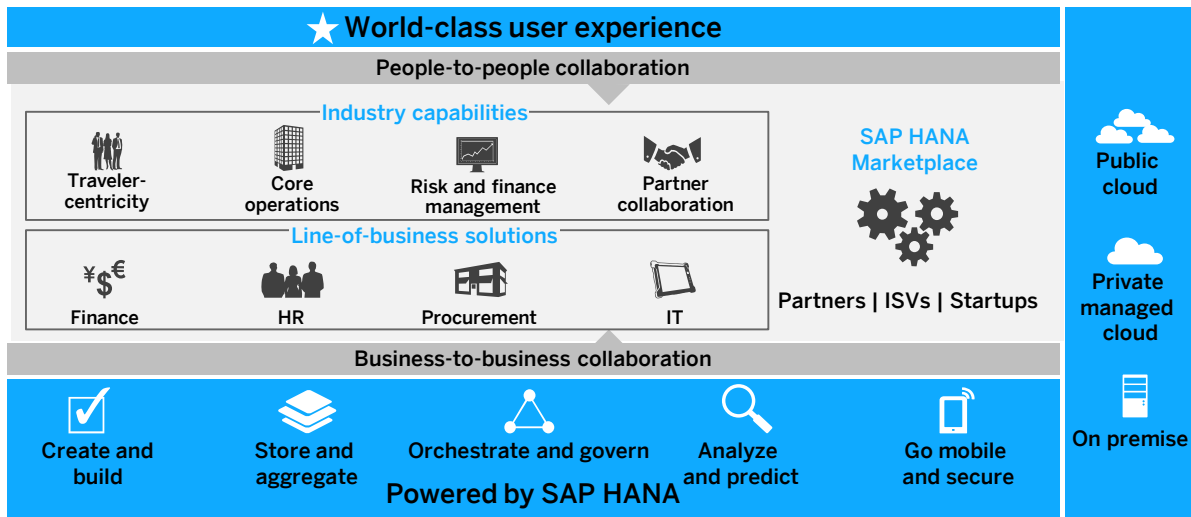
SIMPLIFY

Simplify transaction processing, account management, and traveler service while enhancing operations.

- Deliver superior traveler service and truly connect with travelers through a single view enabled by the SAP HANA platform
- Provide simplified and intuitive insight to traveler profiles, preferences, and contextual information, anytime and anywhere
- Give travelers a smooth omnichannel experience across channels such as Web site, airline app, telephone, e-mail, Web chat, social media, check-in kiosk, etc.

INNOVATE

Use SAP HANA Enterprise Cloud to enable airlines, suppliers, and travelers to connect and collaborate.

- Connect mobile users to enterprise data on travelers, accounts, and services, giving access to the information they need to better serve travelers and run operations
- Process and optimize data on travelers and assets across all operating units and legal entities with SAP HANA in the cloud
- Adopt and apply analytics solutions through the cloud to enhance visibility into traveler demand, operational efficiency, and financial profitability

ACCELERATE

Predict and respond to opportunities and risks with predictive analytics solutions powered by SAP HANA.

- Address unplanned disruptions and maintenance needs more effectively
- Take new products and services to market more quickly and respond to travelers on the platforms they prefer
- Balance market demand and supply with predictive modeling and accurate and timely analytics using SAP HANA; also detect fraud more quickly

SAP GLOBAL SERVICES AND SUPPORT TO DRIVE YOUR SUCCESS

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. SAP's global service and support model provides a consistent experience – on premise,

cloud, or hybrid. SAP's global service and support provide 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 traveler lifecycle.

SAP global service and support provide the expertise, assets, and proven methodologies required to accelerate business innovation, reduce TCO, and run a stable platform (on premise, in the cloud, and hybrid)

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 COMPREHENSIVE ECOSYSTEM
Orchestrating the world to deliver faster value

Our comprehensive ecosystem for airlines offers:

- A wide range of business services (OEM suppliers, banks, key vendors)
- Special technology services for airlines with focus on IT/OT convergence, geospatial integration, aircraft MRO, 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 industry experts with broad and deep skill sets

Our partner ecosystem includes:

Cognizant   accenture High performance. Delivered.   IQUEST   Deloitte.

TATA CONSULTANCY SERVICES   Reply portaltech   indra   pwc

OPENTEXT   BEYONDigital by HCL   icondis travel technology solutions   IBM

Gray Matter Empowering Intuition   Tech Mahindra   Westernacher Innovating Business & IT

BUSINESS NETWORK
- 2.2 million suppliers
- 200 major travel partners (rail, hotel, car)
- 50K service and contingent labor providers

INFLUENCE FORUMS AND EDUCATION
- 32 user groups across all regions
- AirOps and SUGAir – airline-specific user groups
- SAP community >24 million unique visitors per year
- 2,650 SAP University Alliances

IMPLEMENTATION SERVICES
- 13,000 partner companies
- 3,200 service partners delivering 1,300+ airline- specific solutions

DRIVING CUSTOMER VALUE

INNOVATION
- 1,900+ OEM solution partners to extend SAP solutions
- 3,200 startups developing SAP HANA apps

PLATFORM AND INFRASTRUCTURE
- 1,400 cloud partners
- 1,500+ platform partners

CHANNEL AND SME
- Partners with airline-focused templates, extensions, and rapid-deployment solutions
- 4,800 overall channel partners
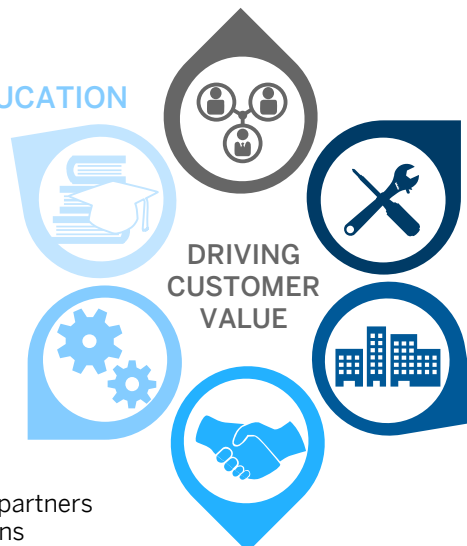
ADDITIONAL RESOURCES

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

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