Transformational IT in the Cockpit:

Passenger Service System (PSS) driving operational efficiency and enhancing customer's experience in Airlines

The potential for Passenger Service Systems (PSS) to add business value to the airlines industry is significant. PSS can enhance the airlines' asset utilization and customer loyalty and thus directly impact the topline. Recent activity suggests that both large airlines and low cost carriers are considering their PSS options seriously. The PSS market is expected to expand, fuelling more IT innovation in the airline industry.

Perspective on use of IT in Airlines Sector

The airline industry profit margins have been among the lowest for the past many years. This at times appears counter intuitive given the global scale of operations of some of the biggest airlines and ever growing demand for air travel. The rising costs and volatility of fuel prices and growing pressures to conform to environment standards are some of the key challenges the sector encounters. This trend will continue to aggravate, providing little operational elbowroom to the airline operators. As per a study conducted by Booz & Company – the airlines' consumer service process efficiencies, innovation, and productivity are lower than those in sectors like financial services and consumer products industry, as shown below:
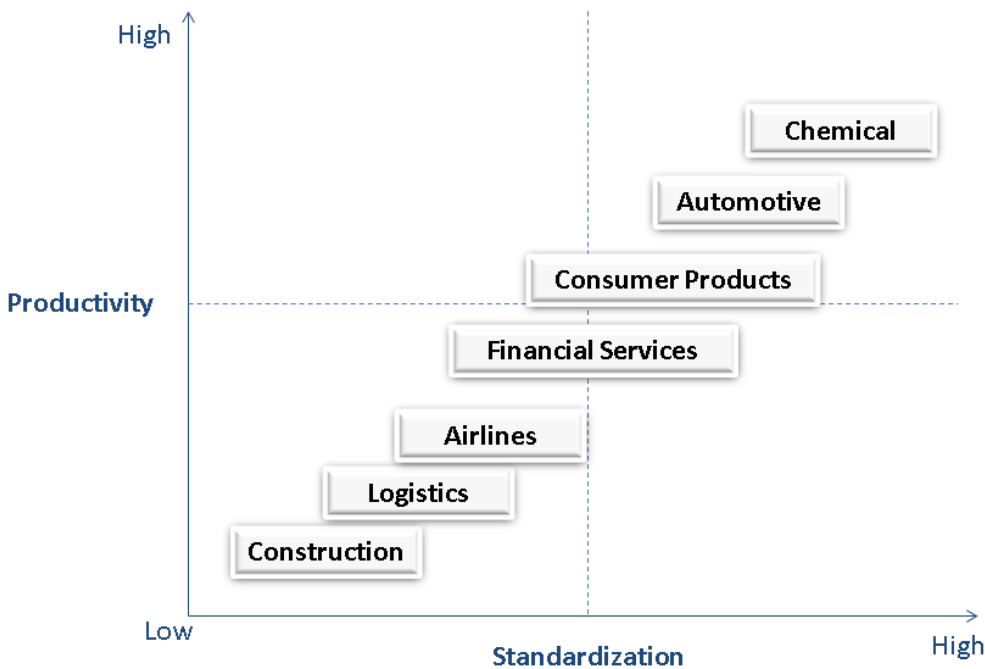

Figure 1 - Process Maturity across Industries
Source: Booz & Company

The operational costs in airlines sector have been increasing 10% every year, over the last five years. To increase profitability and reap the benefit of economies of scale, the airlines industry will have to focus on improving their asset utilization and effectiveness through prudent deployment of IT and leveraging IT to transform their business operations.

Deployment of customized IT applications and non-standardized processes to manage operations has proven to be a bane for the airlines industry. Majority of operating models have many functional siloes making integration a challenge. According to a recent study, of the total software purchased in the airline industry, 60% is customized or made to order compared to less than 40% in other industries. With merger & acquisition activity on the uptick in the sector, integration of disparate IT applications is becoming more complex to manage. Existence of legacy systems in the industry adds to the complexity and hinders the IT and business performance. The current IT initiatives in the airline industry focus on either legacy modernization or replacement of their old IT systems. So far, these have delivered less than expected results and are leading to opportunity losses, which is increasing operational costs and affecting

customer service. To address this, the leaders in the industry are identifying areas where IT can have a substantial positive impact on asset utilization and improving business processes. The most important functional areas are listed below:
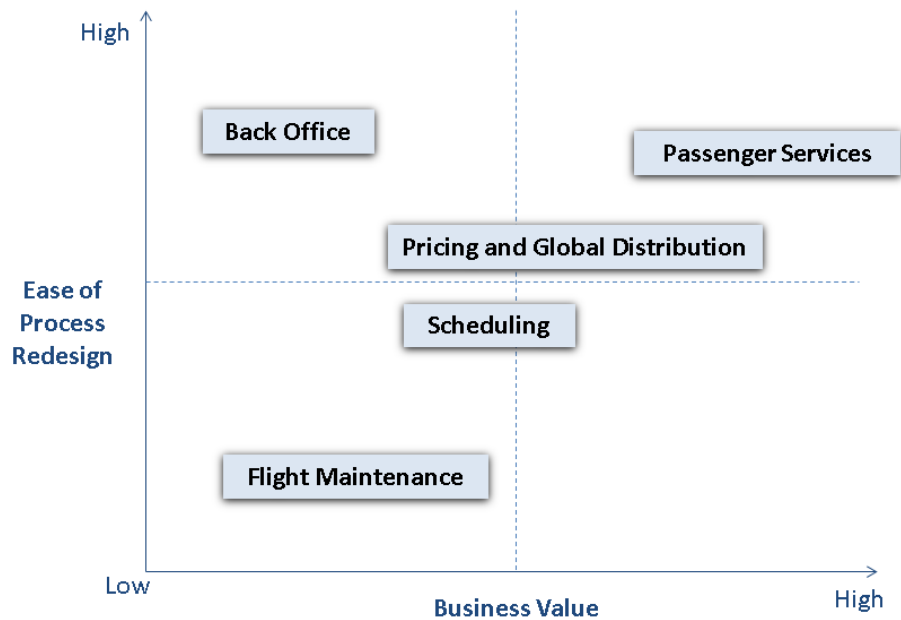

Figure 2 - Potential Areas for IT Solutions in Airlines Business Process
Source: Booz & Company, Avasant Research

Passenger Service System (PSS)

As indicated above, the biggest opportunity to drive business value in the sector is through judicious deployment of IT applications to support Passenger Services. The IT solution for passenger services is commonly referred as Passenger Service System (PSS) and offers the following services:

- Automated Disruption handling
- Advanced CRM
- Integrated e-ticketing
- Interlining
- Revenue Integrity across functions

PSS focuses on enhancing customer experience and improves customer service by enabling fast response to customer needs. This in turn helps to improve customer loyalty while increasing revenues and reducing costs. In a "super-connected" world, PSS is indispensable to provide choice and differentiated service to the customer for following reasons:

1. Airline passengers have become more frugal and have a need to compare wide variety of 'best price' options.
2. Customer can now evaluate options and transact online, enhancing the customer's bargaining power
3. Various blogs and discussion forums now post customer feedback on the airline experience which influence future buying decisions
4. Sustaining customer loyalty towards an airline brand is a very challenging

5.   Customers now have a demand to use mobile devices to transact and purchase services like making reservations, enabling check-in etc.

Having realized the strategic importance of PSS, airlines are significantly increasing their spend on PSS. It is the most purchased and outsourced software application in the airlines industry:
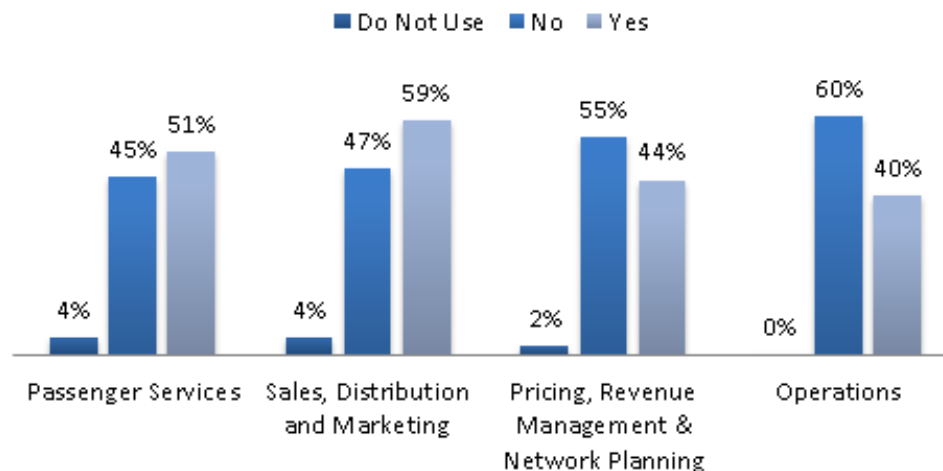

Figure 3 - Airline Applications Purchased or Outsourced
Source: Forrester, Travelport

What are the components of PSS?

The key function of a PSS is to aggregate flight information from multiple airlines, confirm seat availability with the chosen airline and reserve the chosen itinerary for the passenger.

A comprehensive PSS comprises of following components:

(i) **An Airline Reservation System (ARS)**: The system provides an interface with the passenger or a travel agency to enable booking an itinerary. The system also has an interface with a Global Distribution System (GDS), which provides information such as airline schedules, tariffs, reservations and ticket records.

(ii) **An Airline Inventory System**: This maintains records of number of bookings and seats that are available in a particular flight for a class, based on the airlines rules and policies.

(iii) **A Departure Control System**: This manages the check-in process (check weight, confirm seat and print boarding pass) for a passenger. It uses for reference the airline reservation system to validate authenticity and particulars of a passenger. The information entered in the departure control systems is also used by customs and border security agencies worldwide to ensure safety and security.

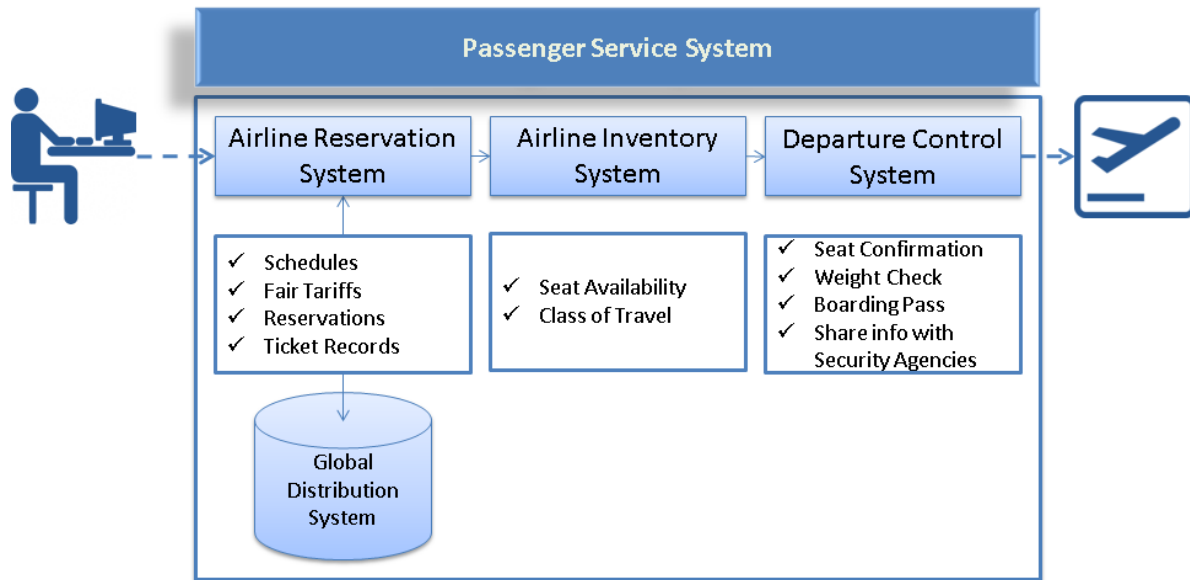This is shown in the following figure:

Figure 4 - Components of an Airline Passenger Service System
Source: Avasant Research

Key providers of PSS Product & Services – A Market Scan

Companies that offer PSS products and services can be broadly segmented into three categories:

1. Those that provide off the shelf (OTS) full-scale product solutions.
2. Those that provide IT Services that are focused on developing customized PSS solutions or supporting the implementation of OTS products and
3. Those that provide ARS which fulfill specific ARS or GDS needs

Profile of some of the leading companies providing PSS products and services are profiled below:

Those that provide off the shelf (OTS) full-scale product solutions

PSS Company	Salient Points

Amadeus
 	
Revenues: $3.6 Billion(2012)
 	
Employees: 7000(2012)
	• Focuses primarily on the European market
	• Majority of the software is open sourced
	• Has two lines of business:
	  ○ Distribution: Offers a digital Marketplace that that connect travel agencies with travel agents
	  ○ IT solutions: Focused on automating mission critical business processes
	• Has capabilities in hotels, rails, cruises etc. through acquisition
	• Has its offshore development center in Bangalore, India and Ops and Data Processing Centre in Erding, Germany

Navitaire
 	
Revenues:
	• Focuses primarily on Low Cost Carriers
	• Is a subsidiary of Accenture
	• Has 4 lines of services
	  ○ Reservations, Internet and Direct Distribution
	  ○ Revenue Management and Price Optimization

PSS Company	Salient Points
N/A *Employees:* *500-1000* *(2012)*	○ Flight Operations and Operations Recovery ○ Accounting Back Office Services - Offshore development center based out of Manila and Cebu, Philippines
Sabre *Revenues:* *$3.2 Bn (2012)* *Employees:* *10,000 (2012)*	- Primarily focused on the North America Market - Owner of some key brands such as Travelocity, Lastminute.com - Has the second largest GDS (by revenue), behind Amadeus - Offshore development based out of Krakow, Poland and Bangalore, India - Its Manila based development center was acquired by NIIT in Sep 2012
SITA $1.57 Bn (2012) 4500 (2012)	- SITA has 3 main subsidies – OnAir which provides online WiFi, CHAMP – the only IT company working solely on cargo and Aviareto which operates the international registry of mobile assets - Other key clients include airports, airfreight - international freight forwarders, travel and distribution - Global Distribution Systems, governments, aerospace, ground handlers and Air Traffic Control. - Offshore development centers are based out of Letterkenny and Dublin in Ireland and Delhi and Mumbai in India

Table 1 - Companies that provide off the shelf (OTS) full-scale product solutions
Source: Avasant Research

Those that provide customized PSS solutions and support services

The key focus areas of these IT service providers are assisting airlines in the migration, system integration and testing of their PSS solutions. Providing customized PSS solution forms a small part of this initiative, although products like HP's SHARES and Unisys's Aircore stand out. The services offered are based on the Service Oriented Architecture (SOA) architecture, which helps airlines create a common abstract layer and standardize the PSS across the airline organization. Some of the most popular companies providing services are as below:

- **HP** – HP's PSS solution called SHARES based on industry best practices is modular in design and is developed grounds up based on SOA. It is used by some of the biggest airlines in North America such as American Airlines and United Airlines. The architecture enables easy customization based on client's immediate needs – be it pricing, shopping, reservations, ticketing, check-in, seat assignment and ancillary service sales. This also reduces the risk of migration to new PSS systems.
- **Unisys** – Aircore, the company's PSS is gaining traction in Asia, especially in China and Japan. Its 100% open sourced platforms help it migrate from legacy applications to modern web based applications. Unisys's PSS solution provides 12 modules that cover the entire process and functionality desired from a PSS.
- **IBM** – IBM's airline PSS forms a part of its wider travel and transport solution portfolio. IBM sells its PSS solution as a system integration tool, aiming at integrating multiple PSS system through creating and implementing an abstraction layer on top of multiple airline solutions. IBM provides the passenger service system integration platform, offering a structured environment built on SOA messaging standards that enables integration of the reservation system through standardized service calls.
- **NIIT** – Based on its experience, NIIT has formulated a six-step methodology that assists its clients in migrating to new products. NIIT helps its clients in migrating interfaces,

data and data warehouse, infrastructure. They provide comprehensive services for testing the solutions. NIIT acquired Saber's Manila based development center in 2012, to further enhance its customized solution and support services. NIIT's key clients are British Airways, Virgin Australia, Virgin America and Cathay Pacific.

- **HCL** – offers custom application development and testing services along with SOA based middleware solutions
- **Hexaware** – offers custom application development and maintenance for booking and check-in process. Hexaware also offers integration services, legacy modernization, business intelligence and testing services. Key markets are in North America and Asia
- **Infosys** – Focuses on mobile and PDA (private digital assistants) based PSS which ensures real time access to the reservation system. Infosys is also using analytics for customer profiling which helps airlines promote merchandises, ancillary revenues and other promotional offers

Those that provide ARS

Airline Reservation System (ARS) was the earliest form of PSS systems and currently forms the biggest part of its spend. ARS pushes and pulls data from the GDS and airlines' reservation system on airline schedules, fare tariffs, passenger reservations and ticket records. The major ARS solutions are offshoots of the parent company's PSS solution such as New Skies (Navitaire), Altea Res (Amadeus), Sabresonic (Sabre) and SITA.

GDS is essentially a network, offered to booking agents that consolidate bookings across airlines, hotels, car rentals etc. It establishes a real time link to the vendor database and maintains a mirror image of a customer's booking. The three main GDS global owners are Amadeus, Travelport (includes Galileo and Apollo) and Sabre with market shares of 45%, 20% and 10% respectively.

Demand for PSS and adoption trends

Increase in an airline's fleet size, coverage sector, number and frequency has a direct impact on increasing the complexity of their processes and systems. In such a scenario, implementation of a suitable PSS solution helps in standardizing the processes while supporting scalability. It also helps in improving operational efficiency thus further driving demand for PSS.

Large Carriers

Since providing reservation details and ticket availability to customers was a key differentiator for large airlines during 1960s, many developed their own customized reservation systems. Last few years the trend is to migrate from in-house developed PSS to third party service provider or implementing a standardized solution based on industry best practices and adding customized modules to the solution. Key trends are summarized below:

Region	Airlines	Fleet Size (# of aircraft)	Latest Trends
North America	American Airlines	965	American Airlines moved from Sabre to HP's SHARES before finally deciding to develop the PSS in-house due to specific nature of their processes and staff requirements.
	Delta Airlines	735	Delta Airlines have hired Farelogix to build a reservation system that will aim saving the airline $300 Mn annually. Delta airlines are switching back from outsourcing to Sabre, Amadeus and Travelport(Apollo)
	United Airlines	695	United after integration with Continental, chose HP SHARES over Travelport because of its ability to handle migration in a reasonable amount of time
	Southwest Airlines	582	Southwest Airlines has selected Amadeus's Altea for their wholly owned subsidy AirTran that serves international destination. Southwest had also shortlisted SABRE for the final round of selections
Europe	Air France	242	Air France was a founder member of the Amadeus group as a competitor for Apollo. Amadeus is currently being used by Air France.
	British Airways	261	British Airways utilizes the Amadeus solution with IT support from NIIT
Asia Pacific	China South-ern Airlines	446	TravelSky is the dominant provider of PSS based IT solutions to many of the China's Airlines. Both are state owned enterprise, have recently signed a deal with Unisys, and will utilize its Aircore systems as a step towards modernization of the passenger sales and services.
	China East-ern Airlines	354	
	All Nippon	189	All Nippon Airlines (ANA) migrated its PSS to Unisys's Aircore after using in-house PSS for 34 years. This migration was supported by Unisys' Japan subsidiary – Nihon Unisys. Aircore is a first ever PSS platform built on Open Standard Platform.

Region	Airlines	Fleet Size (# of aircraft)	Latest Trends
	Cathay Pacific	140	Cathay Pacific has chosen the Amadeus Altea for its PSS requirements and migrated from an in-house based mainframe system in early 2012
	Singapore	99	Singapore Airlines has chosen the Amadeus Altea for its PSS requirements and migrated from an in-house based mainframe system in Jun 2012
MEA	Emirates	213	Emirates plans to shift from the current Mercator PSS system to either Sabre or Amadeus. The decision is expected to be announced in Jan 2014
	Etihad	89	The Etihad airlines has signed a $10 Bn dollar – 10 year deal with Sabre to integrate Etihad Airways' current PSS into one platform that will utilize SABRE's software across its reservations, inventory, ecommerce, distribution and departure control activities

Table 2 - PSS Solutions used by Large Airlines
Source: Centre for Aviation (CAPA), Avasant Research

From demand trends, it appears that HP's SHARES and Amadeus's Altea are the most popular PSS solutions implemented in North America. Unisys's Aircore is in demand in the Asia-Pacific region. Sabre has a good market in Middle East and Africa. However, Amadeus's Altea being an industry leader, has demand across all regions for large carriers.

Low Cost Carriers

Low Cost Carriers have increased their adoption of third party solutions as they did not have any legacy systems and also the capital requited to develop a PSS solution in house. Third party PSS solutions enable them to enlist themselves in airline booking queries worldwide, almost immediately. The global market share based on seats per week of airlines concerned is shown in the following figure:
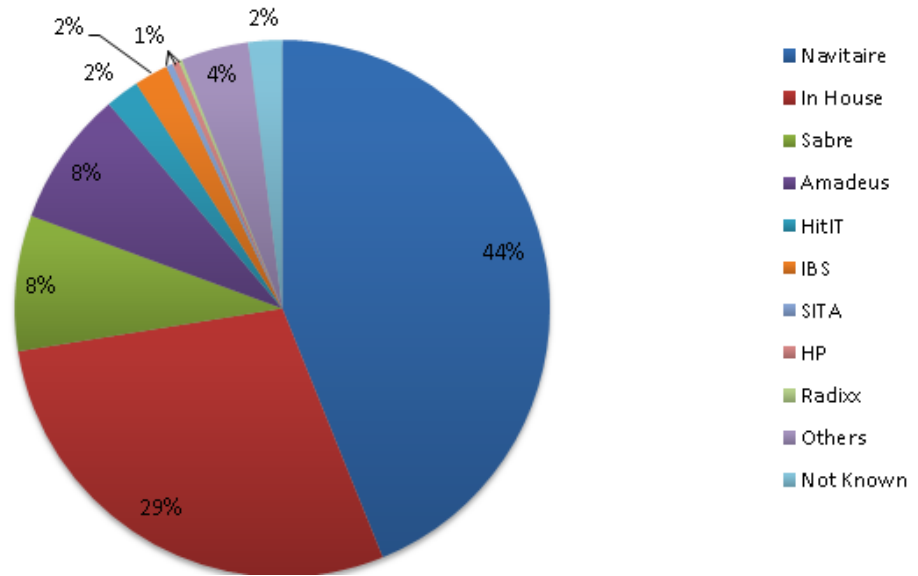
Figure 5 - No. of Seats booked per week in Low Cost Carriers, 2011
Source: Centre for Aviation (CAPA)

The table below summarizes some of the most widely used PSSs by region:

Region	PSS	Key Clients
North America	Navitaire	AirTran, Spirit
	Sabre	Southwest, JetBlue West Jet, Frontier, Sun Country
	IBS	Virgin America
Latin America	Navitaire	Gol, Azul, Interjet, Volaris+
Europe	Navitaire	Ryanair, Vueling Airlines, , Wizz Air, German Wings
	Amadeus	Air Berlin, Norwegian Air, Nikki, Air Baltic, Smart Wings,
	HP	Flybe
	SITA	Meridiana Fly
Asia Pacific	Navitaire	Air Asia, Jet Star, Virgin Australia, Indigo, Spice Jet, Cebu Pacific
	Amadeus	Jin Air
	IBS	Skymark
	Sabre	Lion, Jetline
	SITA	Air India
	Mercator	Mihin Lanka

Region	PSS	Key Clients
Middle East and Africa	ISA	Air Arabia
	Navitaire	1time, Jazeera Airways, NAS Air
	Mercator	Mango
	Sabre	Kulula

Table 3 - PSS Solutions used by Low Cost Carriers
Source: Centre for Aviation (CAPA), Avasant Research

A report by Travel Technology Research concluded that last few years there has been a marked increase in the demand for PSS solutions in the Low Cost carrier segment. Many migration contracts were signed to migrate the function to specialist third party solution and service providers rather than developing and maintaining their own PSS application suite. Amadeus and Sabre are the dominant players in the segment.

Concluding Remarks

Third party PSS solutions are fast gaining popularity – equally among the large carriers and LCCs. There has been a visible slew of migrations from legacy platforms, which were mostly in-house to web-based self-service solutions. Adherence to open standards, open sourcing, and service oriented architecture methods of product development are ensuring speedy development, modular design and easy customization of products. The architecture is also enabling implementation based on best practices. As airlines increase collaboration on regional and global routes and consolidate their operations worldwide, these third party solutions will have a bigger role to play in providing seamless booking service to the customer. New age solutions like community clouds are also helping airlines further collaborate and scale industry wide PSS solutions. With cost optimization and customer service becoming the key business goals, solutions like community cloud is expected to offer a common innovative platform while being cost effective. PSS product developers such as SITA have already ventured on creating the community cloud and claim that it will have a potential of saving upto 30% on the service. International Air Transport Association (IATA) is currently working on an industry wide community cloud strategy and believes its adoption will grow significantly. PSS, being a critical enabler of the airlines industry as it helps the airlines remain competitive by optimizing costs and increasing customer loyalty. In the next few years, it is expected that PSS spend will see significant increase as it will become a more standardized, collaborative, and industry wide phenomenon.

Author

Dr. Pradeep K. Mukherji is a President and Managing Partner at Avasant. For more information on the Travel, Tourism and Transportation industry, email him at **pk.mukherji@avasant.com**

Chirag Rawat is Senior Consultant at Avasant. For more information on the Travel, Tourism and Transportation industry, email him at **chirag.rawat@avasant.com**

1960 E. Grand Avenue. | Suite 1050 | Los Angeles |
California 90245 | USA

Tel: 310-643-3030

Fax: 310-643-3033

Email: contactus@avasant.com

About Avasant

With its global headquarters in Los Angeles, California, Avasant is a leading management consulting, research, and events firm servicing global clients across the public, private, and non-profit sectors. Our talented team of consultants, lawyers and technologists average over 20 years of industry-honed experience and have conducted 1,000+ engagements in over 40 countries worldwide. Avasant drives customer value through the use of our proprietary consulting and advisory methods, which have been refined over decades of 'real-world' transaction and engagement experience. The combination of our world-class resources allows Avasant to yield superior business outcomes in three primary domains: Strategic Sourcing, Technology Optimization and Globalization Consulting.