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The contents and comments in Chapter 1 to Chapter 3 of this report are solely CAPA India's view.

## CONTENTS

|  |    |
|--|----|
| FOREWORD FROM SITA CEO.....  | 3  |
| FOREWORD FROM CAPA CHAIRMAN .....                                  | 4  |
| CHAPTER 1: Background on Indian Aviation .....                     | 6  |
| CHAPTER 2: Challenges Faced by Indian Aviation.....                | 15 |
| CHAPTER 3: The Future of Indian Aviation .....                     | 22 |
| CHAPTER 4: The Role of IT in Aviation – A Global Perspective ..... | 26 |
| CHAPTER 5: IT Infrastructure in India - Market Survey.....         | 32 |
| CHAPTER 6: IT - A Critical Business Component for the Future.....  | 49 |

## FOREWORD

### FRANCESCO VIOLANTE, CEO, SITA



SITA has been actively involved with the Air Transport community in India for over 50 years as a trusted partner to airlines, airports and the many related air transport organisations. It has supported the development of Air India almost from its inception, and today is involved in all aspects of air transport in the country from the cockpit to the baggage carousel, from airline operations to airport management and much else in between.

On the airport front, SITA has pioneered airport IT system automation in India including the introduction of check-in systems for multi-airline use such as Common User Terminal Equipment (CUTE) and more recently Common Use Self Service (CUSS) Kiosks. It has also introduced a Baggage Reconciliation System (BRS) in Bangalore and the country's first modern Airport Management System (AMS) at Mumbai International Airport.

It also supports the country's border management by providing Advance Passenger Information System (APIS) services to more than 50 international and domestic airlines operating in India to ensure their compliance to the Indian government APIS requirement.

After two decades of alternating stagnation and unprecedented growth, civil aviation in India is entering a new phase of development and SITA is pleased to be part of this exciting new era. Passenger numbers are again starting to rise following 12 months of decline, new airlines, including low-cost carriers, have introduced new levels of competition, and airports, which expect to benefit from US \$20 billion of investment over the next 10 years.

The Indian aviation market is poised for growth, and with less than 2% of Indians currently travelling by air in any given year, the opportunity is tremendous. However, rapid growth poses new challenges.

Today, IT has become a facilitator for transformation in an increasingly digital passenger environment. The Indian aviation industry is already using technology to automate and speed up processes, to reduce costs, to improve operational efficiencies and to create distinct competitive advantages. More can be done and we have seen from last year's global SITA Passenger Self-Service survey that passengers at Mumbai International Airport are eager to embrace new technology and the convenience which it offers.

This important report sheds further light on how the industry can progress and transform itself through the power of IT with its focus on IT investment and management issues, key technology projects and trends.

As the world's leading specialist in air transport communications and IT solutions, we look forward to continuing to work with the Indian aviation industry during this exciting period of transformation and change and we are proud to be associated with CAPA in delivering this report to the industry.

A handwritten signature in black ink, appearing to read 'F. Violante'.

Francesco Violante  
CEO, SITA

## FOREWORD

### PETER HARBISON, CHAIRMAN, CAPA



CAPA India is committed to bringing global knowledge to Indian aviation, by providing high level research and market analysis alongside our reputed advisory services. This report on information technology, is the latest in a series of regular features which we have released on key industry issues.

Technology has always been an integral part of aviation. This most global of industries which brings together so many stakeholders around the world, is dependent upon information, data and communication. But in recent years, technology's role has become far more pervasive. From playing a support and enabling function, technology now has the potential to transform the operations of airlines, airports, service providers and border control, delivering not only cost efficiencies, but enhanced passenger experiences, new commercial opportunities and improved security.

As Indian aviation enters its next growth phase, we felt that it was important to understand how the industry views technology. We therefore conducted an extensive series of interviews with senior management and technology executives across airlines, airports and government, to enquire about current deployment, results to date, challenges to greater implementation and the overall strategic role of technology. This report presents the findings of this study.

CAPA is delighted to have established a knowledge partnership with SITA for this report. SITA is the world's leading air transport communications and information technology specialist. The organisation has been synonymous with aviation technology solutions for the last 60 years and is the ideal partner to support a study of this nature.

The advance of technology and its potential application continues to accelerate. However preparing and planning for future developments in such a dynamic environment brings its own challenges for senior management. The first step is to be aware of the issues and to understand their implications. We hope that this report contributes to this process.

A handwritten signature in blue ink that reads "Peter Harbison". The signature is fluid and cursive, written in a professional style.

Peter Harbison  
Chairman  
Centre for Asia Pacific Aviation



## CHAPTER 1: Background on Indian Aviation

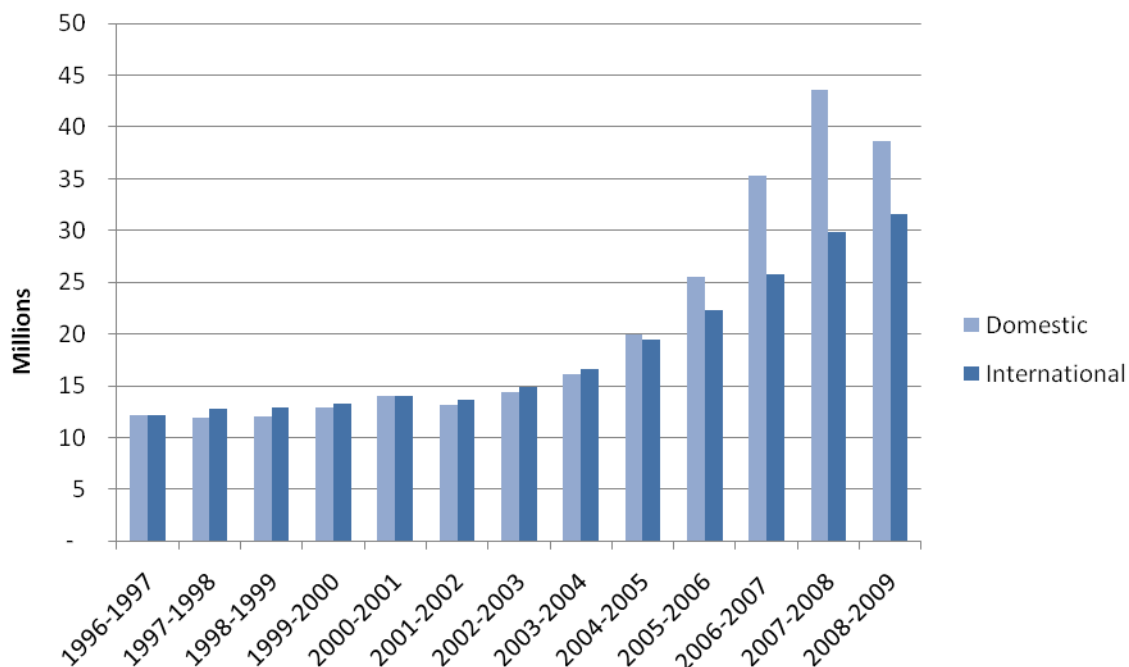
Civil aviation in India is now entering a new phase of development after two decades during which the sector has witnessed both stagnation and unprecedented growth. The industry has experienced some of the natural growing pains of a sunrise sector, but numerous lessons have been learned and are being acted upon. Despite the recent growth, less than 2% of Indians travel by air in any given year, highlighting that we have barely arrived at the threshold of the growth potential of Indian aviation.

### Recent History of Domestic Aviation

- **Pre-1993:** Aviation was traditionally viewed as an elite activity, and one in which socialist governments could not be seen to allocate resources. The two government airlines Air India (long haul international) and Indian Airlines (domestic and shorthaul international) were the only Indian carriers. Both carriers operated with relatively old aircraft and inefficient work practices, from airports which were functional at best. There was no focus on developing traffic and the market grew at uninspiring single digit rates.
- **1993-1995:** The first steps in domestic aviation deregulation were taken allowing private airline entry, first as air taxis and then as scheduled operators. However, the government was still focused on protecting the state-owned carriers, and a slew of under-capitalised and underprepared start-ups entered and then mostly exited the market. Only Jet Airways and Air Sahara survived beyond the initial couple of years.
- **1995-2003:** After the “failure” of the deregulation experiment, the industry fell into dormancy. No new carriers entered the market and Air India and Indian Airlines continued to be starved of capital. Despite the fact that the broader economy performed well during this period, aviation continued to show limited growth. Aviation was largely untouched by the economic reform agenda of the governments in power as there was little strategic direction for the sector.
- **2003-2006:** This was a period of unprecedented change. With the arrival of Ministers of Civil Aviation on both sides of parliament that recognised the importance of aviation for the development of business, trade and tourism, and who had a vision for delivering a vibrant and modern sector, the industry saw dramatic reforms across the aviation value chain. Developments included:
  - Domestic open skies policy which saw market entry by several carriers;
  - The arrival of the low cost airline model in India with the launch of Air Deccan, and subsequently SpiceJet, IndiGo and Go Air;
  - Announcement of the airport modernisation plan, including the privatisation of Delhi and Mumbai, upgradation of 35 non-metros and encouragement of Greenfield development;
  - Placement of orders for 111 new aircraft for Air India and Indian Airlines;
  - Liberalisation of the international sector with some private carriers permitted to operate overseas; greater access for foreign carriers and opening up of international routes for non-metro airports;
  - Increased foreign direct investment caps in certain sectors of the industry.

Traffic started to accelerate at double digit rates, both domestic and international, levels never before seen in India, highlighting a latent demand for travel.

### India Annual Domestic & International Passenger Numbers 96/97 – 08/09

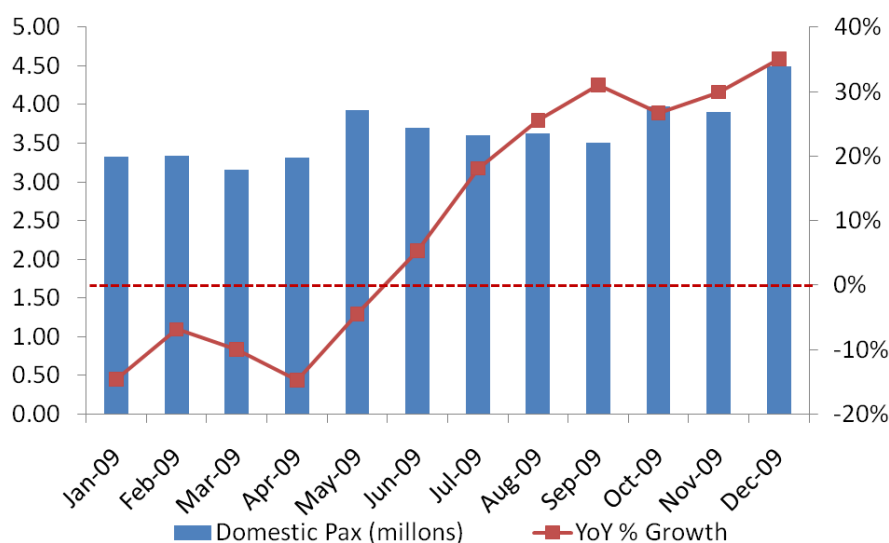


- **2006-07:** During this period, traffic continued to accelerate further, to levels approaching 40% in 2007. However it was at this stage that the realities hit home – although traffic was buoyant, yields were being slashed through overcapacity and fragmentation of the industry, and costs were increasing because of the poor state of airport infrastructure and a shortage of human resources.
  - The bullish fleet orders placed by Indian carriers saw capacity being introduced at the rate of 6 to 6.5 aircraft a month, whereas the actual growth in demand was closer to 3 aircraft equivalents;
  - Aside from the mis-match between supply and demand, the rate of growth was simply too great for the industry to handle from a management and capital perspective.
  - In a fragmented market, with multiple start-ups chasing market share, loss-leader pricing was widespread and Air Deccan in particular was responsible for setting fares well below cost as it fought to retain its first mover market share;
  - The rapid increase in capacity at a time when the airport modernisation program was yet to deliver upgraded infrastructure, meant that airports and airways were highly congested, increasing airline operating costs;
  - With the inadequate surface access and airport (and airways) infrastructure, airlines were unable to secure a significant competitive edge over other means of travel, thereby excluding huge parts of the still-untapped leisure market;

- In a period of global boom, demand for skilled personnel such as pilots and engineers also outstripped supply leading to a sharp escalation in wages, and in some cases grounding of aircraft due a shortage of staff;
  - Balance sheets were stretched as a result of the aggressive fleet induction programs, combined with the mounting operational losses.
- **2008-09:** The fragility of the sector - which had overextended itself by growing at rates that it could not manage, in an environment that was not conducive to efficient operations – was exposed during the fuel price spike of mid-2008 when oil reached close to US\$150/barrel. In India, this situation was exacerbated by the taxation structure which increases the costs of fuel by up to 60% vis a vis international benchmarks. As costs spiralled upwards, carriers were forced to raise fares, and with a simultaneous slowdown in the Indian economy, there was resulting decline in traffic of around 10-12% year-on-year.
  - **2009-10:** After the dramatic changes of the last five years, we are starting to see the emergence of a more favourable environment. India’s GDP growth slowed from over 9% in 2007/08 to 6.1% in 2008/09. However, given the contraction globally, this was a relatively a good result. The economy appears to be recovering earlier than expected, with GDP growth of 7.9% in the last quarter, ahead of expectations.

Domestic traffic is also showing a return to growth. After 12 consecutive months of year-on-year declines in domestic traffic, July 2009 saw a return to positive territory, which has continued since then. This is partly due to the impact of a lower base resulting from last year’s decline, however discussions with the industry indicate a discernible increase in demand as business and consumer confidence increases.

#### India Monthly Domestic Passenger Numbers Last 12 Months



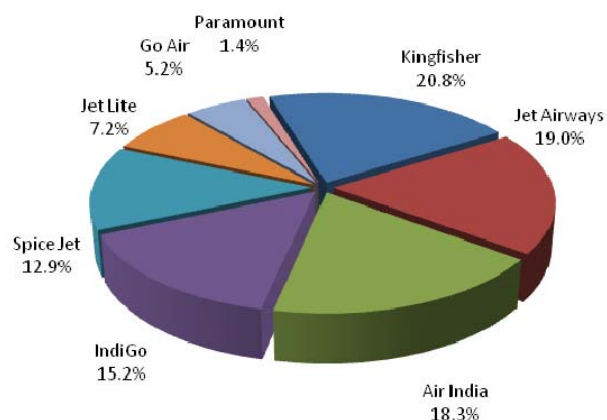
## AIRLINES

The airline landscape in India has been transformed in recent years. In 2003 there were just 4 carriers – Air India, Indian Airlines, Jet Airways and Air Sahara - all operating full service models. And private carriers in those days were limited to operating domestic routes only. Today, there are effectively 7 airlines operating 11 different brands.

- Air India + Air India Express
- Jet Airways + Jet Konnect + JetLite
- Kingfisher Airlines + Kingfisher Red
- IndiGo
- SpiceJet
- Go Air
- Paramount

On the domestic front, the 3 large airline groups – Air India, Jet Airways (+ JetLite) and Kingfisher Airlines command a 65% market share.

### Domestic Market Share December 2009



In the 4 years to March 2010, it is estimated that Indian carriers will have accumulated operational losses of in excess of INR260 billion, of which the three large airline groups (Air India, Jet Airways and Kingfisher Airlines) account for almost INR230 billion. CAPA estimates that the losses for the current financial year will be in the order of INR65-70 billion.

The most significant recent strategic development in the Indian domestic market is that it is rapidly turning low cost. An operating model which did not exist in the Indian market until 6 years ago, could account for almost 70% of domestic capacity by the end of this fiscal. This is due to the decision taken by carriers such as Jet Airways and Kingfisher Airlines to reconfigure the majority of their domestic aircraft to operate all-economy, no-frills service. Air India is also planning to follow suit. There has been a clear recognition that there is a limited market for full service travel, particularly business class, beyond the key metro routes. Full service may in future be restricted to just a handful of services. It is driven by a decisive change in the demographic profile of the Indian domestic traveller. Whereas 5 years ago, approximately 80% of air travel in India was for business, today that figure is less than half.

## AIRPORTS

India's airports have suffered from decades of neglect and underinvestment. When the Naresh Chandra Committee presented its report to the Ministry of Civil Aviation in November 2003, it remarked frankly that the country's "passenger airports are for the most part an embarrassment".

The inadequacy of the state of airport infrastructure was exposed as air traffic expanded dramatically from 2004 onwards, pushing several metro airports to well beyond their design capacity. Congestion in the terminals, on the runways and in the air, resulted in a deteriorating passenger experience and an increasingly inefficient (and costly) operating environment for the airlines. Recognising the potential for airport infrastructure constraints to stifle the aviation industry, in 2005 the Government of India announced a USD10 billion airport upgrade and modernisation programme over 5 years to 2010. A further USD20 billion of investment is expected in the following 10 years.

Acknowledging that it possesses neither the expertise nor the capital to carry out such an undertaking by itself, the government has invited private sector participation in the process, with JV operators now in place at Delhi, Mumbai, Bangalore, Hyderabad and Cochin. All other airports remain under the control of the state-owned Airports Authority of India (AAI).

**Airports Authority of India:** The Airports Authority of India, which until the late 1990s held responsibility for all airports in the country, has in recent years experienced a significant change in its role. Five of the largest airports in the country – Delhi, Mumbai, Bangalore, Hyderabad and Cochin – accounting for more than 60% of traffic have been transferred to a PPP model and are led by private consortia. This has had a negative impact on the AAI's revenues, further compounding the impact of the recent decline in traffic. Of the 89 operational airports which remain under the AAI's control, only 7 are profitable and are having to support the other loss making facilities.

This comes at a time when the government has committed to a very highly capital intensive investment program to upgrade and modernise the non-metro airports across the country. In fact, INR124 billion has been allocated for spending in the 11<sup>th</sup> 5 Year Plan. There is consequently an emerging shortfall between revenue and expenditure that is potentially a serious issue for the airport operator.

The AAI had planned to issue tax free bonds as a capital raising measure, however this approach has been rejected by the Ministry of Finance. The authority is therefore expected to turn to debt instruments and will approach banks to raise approximately INR6 billion over the next few months. As the AAI is a 'AAA' rated entity with cash reserves of around INR50 billion this should be achievable.

However, beyond the immediate funding gap, the AAI needs to look more closely at developing a strategy to re-invent itself in light of the change environment. At a corporate level, the authority needs to be restructured to develop a more commercial approach, competing more effectively for traffic vis a vis the private airports. Not only will this be beneficial for the AAI's financial position, but it is also consistent with the policy objective of distributing traffic to smaller cities and reducing the

concentration on the key metros. The AAI should also focus on developing other commercial opportunities. For example there is huge upside in the potential for growing non-aeronautical revenue, such as duty free, domestic retail and food and beverage, for which technology-based tools are available. Furthermore, at the level of each individual airport there needs to be a business plan prepared and followed.

In an effort to increase the commercial focus of the AAI, corporatisation of the authority has been discussed, however progress has been slow. More likely in the short term is a hiving off of the air traffic management responsibilities into a corporatised unit, separate from the airport operator. As a first step towards this development, the AAI has appointed a new Board Member for Air Traffic Control.

**Non-Metro Airports:** The government had identified 35 non-metro airports for upgrade and modernisation with initial plans to complete all work by 2009. However, due to the slowdown in traffic over the last year and issues related to fund raising, completion has been delayed. It is now expected that work at 8-9 airports will be completed by March 2010, and at a further 4-5 airports by the end of 2010. The target is to have modernisation of all 35 airports completed by 2012.

It was also earlier intended that private sector participation would be invited in terminal operations and landside commercial development. However, it has subsequently been decided that terminal and cargo operations will be retained by the Airports Authority of India and only landside development will be opened to external parties.

#### Non-Metro Airports Identified for Upgrade and Modernisation

|             |           |            |
|-------------|-----------|------------|
| Agartala    | Goa       | Port Blair |
| Agatti      | Guwahati  | Pune       |
| Agra        | Imphal    | Raipur     |
| Ahmedabad   | Indore    | Rajkot     |
| Amritsar    | Jaipur    | Ranchi     |
| Aurangabad  | Jammu     | Trichy     |
| Bhopal      | Khajuraho | Trivandrum |
| Bhubaneswar | Lucknow   | Udaipur    |
| Chandigarh  | Madurai   | Vadodara   |
| Coimbatore  | Mangalore | Varanasi   |
| Dehradun    | Nagpur    | Vizag      |
| Dimapur     | Patna     |            |

**Greenfield Airports:** The Greenfield airport projects most likely to progress to the tender stage in the near future are Navi Mumbai and Mopa in Goa, with Request for Proposal documents expected to be issued in the first half of 2010. Navi Mumbai, which will be the second airport in Mumbai, is critical to ensure that sufficient capacity is available to serve India's commercial and financial capital. The current airport in the city will reach capacity within the next 5-7 years, with no opportunity for further expansion thereafter due to physical constraints.

Navi Mumbai airport is expected to be operational by 2014-15, although the City and Industrial Corporation which is responsible for the development of Navi Mumbai, is pushing for completion a year earlier. The airport will have a capacity of 10 million passengers per annum at the time of opening, increasing to 65 million by 2030. Presently, 57% of the required land for the airport has been acquired, with the balance in the process of being transferred. The process will involve the resettlement of 3,000 families. A key obstacle to the development of the airport has been environmental considerations due to the fact that the proposed site falls within a coastal protection zone. An Environmental Impact Assessment is to be carried out by the Indian Institute of Technology Bombay.

**Other Airports:** In addition to the 35 non-metro airports already identified, the AAI plans to modernise a further 13 airports and operationalise another 32 facilities which are currently not being utilised. Meanwhile, the upgrade of Kolkata and Chennai airport by the AAI continues, although costs have exceeded initial budgets. CAPA expects that a greenfield airport project may be announced for Chennai during the next financial year.

**Private Airports:** The private operators of Delhi and Mumbai Airports are currently focused on achieving their deliverable targets for the Phase 1 of their upgrade projects - however the very high revenue shares which they have committed to the government (46% in the case of Delhi and 37% in Mumbai) is hurting their financial position, given the traffic slowdown at a time of high capital expenditure. The structural shift in the industry towards low cost airlines will also have significant implications for the business models and infrastructure requirements for the airport operators.

## ANCILLARY AVIATION SERVICES

**Air Traffic Control:** The Airports Authority of India manages one of the largest airspaces in the world, including a large oceanic component, for a total of 6 million square kilometres. The dramatic growth in traffic over the last 5 years led to serious air congestion. The AAI has been investing in increased automation and improved ground infrastructure, although several hundred million dollars of further equipment is required to upgrade India's CNS/ATC systems, a process which is linked to the induction of the satellite-based system GAGAN, developed in collaboration with the Indian Space Research Organisation.

The AAI has made important strides towards addressing the management of recent and projected growth. Its Future Indian Air Navigation System Masterplan consists of the following four key elements:

- Investing in modernising airport infrastructure;
- Upgrading Communications, Navigation, Surveillance (CNS), Air Traffic Management (ATM) and meteorological equipment;
- Enhancing manpower and training infrastructure.
- Harmonisation with other global initiatives in line with the ICAO Global and Regional Air Navigation plans.

**General Aviation:** This has been a neglected sector of the aviation industry but one which could have significant positive economic benefits. The general aviation industry in India is at a nascent stage, however strong GDP growth and rising wealth are stimulating demand. Furthermore, the long distances and poor state of surface infrastructure in India make this an ideal market for air travel, particularly to smaller and more remote destinations where scheduled services do not operate. The expansion of all-economy services and gradual removal of business class could further drive demand for private aviation from the senior corporate segment. Non-scheduled passenger traffic has more than doubled in just the last 4 years.

Demand is largely from the corporate sector, however there is increasing take-up related to luxury travel, and demand for helicopters exists for elections, tourist and pilgrimage destinations, offshore oil and gas platforms, city-airport transfers, aerial surveying in the resources sector, washing of power lines etc.

Strong growth has been witnessed over the last few years, in fact India has the fourth highest number of firm business jet orders (137) in the world, more than the size of the current fleet (113). In the next 5 years, India will have one of the ten largest business jet fleets globally. Industry sources suggest that the helicopter fleet could triple within 5 years from just over 260 rotorcraft today. A key driver will be the availability of helipads and landing facilities. The new greenfield airport policy announced in April 2008, included a streamlined process for approval of new private airports and helipads.

**Training and Education:** The critical role of skilled human resources in supporting the growth of the industry is often overlooked. Our research reveals great concern amongst both operators and suppliers that skills shortages could constrain the sector. India today faces not only insufficient training capacity, but the quality of that which is currently available is in many cases questionable. This not only has implications for the efficiency of operations and the quality of the customer experience, but more importantly for safety.

The demand for training is derived not only from the growth of the industry, but also from the need to enhance the capabilities of existing staff. Regulatory change and greater harmonisation with FAA and EASA standards will also generate a need to upgrade skills.

During the peak of the traffic boom, pilot shortages resulted in aircraft being grounded, whilst salaries in all areas increased sharply. The current slowdown has relieved pressure in some areas but this is a temporary phenomenon. With traffic returning, it will not be long before the industry again faces a crunch with respect to pilots, engineers, cabin crew, air traffic controllers and management. There is also a critical need for qualified people within the regulatory bodies – it was the shortage of aircraft inspectors within the DGCA, amongst other issues, that nearly cost India its Category 1 status with the FAA.

Global training providers have recognised the need in the Indian market, however many have found the regulatory environment to be unwelcoming or the difficulties of doing business in India too challenging. However, we detect an increasing recognition amongst senior government officials of the importance of training for the long term health of the industry and a commitment to supporting

initiatives in this area. Developing in-country capabilities and reducing reliance on offshore training will not only be more cost effective, but can also contribute to the development of a globally competitive ancillary support sector and a vibrant aerospace industry with potentially long term economic benefits to the nation.

**MRO:** In theory India has the potential to be a highly competitive global location for MRO services. With one of the world's largest pools of English speaking engineers, at comparatively lower cost to Western benchmarks, there is a clear opportunity here. The demographic dividend which India enjoys of a very young population and which will continue to feed the working age cohort for several decades to come, means that wages are likely to stay competitive for much longer into the future than say in the case of China.

Numerous projects have been proposed by global companies – if all had come to fruition there would have been overcapacity in the market, however the reality in fact is that very little has seen the light of day. The sector has been thwarted in part by an unwelcoming taxation structure, an absence of high quality training institutions to develop the skills base and the global economic slowdown. Projects which have been announced in the past (although several of these have now been cancelled or are on hold) include:

- Air India is planning four MROs 1) airframe JV with Boeing at Nagpur 2) airframe JV with EADS at Delhi 3) GE engine overhaul at Mumbai 4) components MRO, possibly with Boeing.
- Jet Airways / Bangalore International Airport;
- Kingfisher Airlines / Bangalore International Airport;
- Lufthansa Technik / GMR (Lufthansa Technik has withdrawn but replaced by Malaysia Airlines Engineering);
- HAL-TIMCO narrowbody airframe MRO;
- Thales avionics maintenance centre at Gurgaon;
- Taneja Aerospace Aviation Limited at Pune;
- Air Works for narrowbodies and turboprops at Hosur;
- Sabena Technics / Taneja Aerospace for components at Hosur;
- Airbus / HAL for airframe at Nashik;
- Pratt & Whitney / HAL for engines at the old Bangalore Airport;
- Indamer at Mumbai;
- Cochin Airport;
- HAMCO, Hyderabad (appears to have been shelved);
- Duke Aviation, Nagpur.

Amongst the above, the most likely ones to proceed are the Air India MROs (although there is no haste observed with the construction of the Nagpur facility); the GMR-Malaysia Airlines JV in Hyderabad, which may enter into an agreement to maintain Jet's B737 fleet, which would provide the base load demand; and the HAL-TIMCO narrowbody aircraft MRO. Most of the others appear unlikely to go ahead at this stage. Major opportunities exist in the MRO sector for general aviation which is currently significantly underserved, not only for maintenance, but also for interior refurbishment and reconfigurations. Currently, most aircraft have to be sent overseas for such services.

## CHAPTER 2: Challenges Faced by Indian Aviation

### AIRLINES

#### Fuel Prices

Aviation turbine fuel is the largest individual input cost for Indian carriers and yet it is also one of the most volatile. In the last 18 months, the international oil price has ranged from US\$40/barrel to US\$150/barrel creating significant headaches for airline management. Increases in fuel costs not only squeeze margins, but beyond a point they necessitate higher fares which have a corresponding negative impact on demand. Fuel hedging is now permitted by airlines in India to mitigate some of this risk, although this strategy is also not without its pitfalls. A number of major global carriers found themselves incurring major losses as they unwound forward fuel contracts that had been struck at levels much higher than the eventual spot price.

Fuel remains the great unknown for the industry. Despite the more optimistic outlook that currently prevails, if the return of global economic growth results in higher oil prices the environment could turn negative for the industry once again.

Fuel price volatility is an issue for all global carriers. However, airlines in India face an additional challenge, namely the fiscal regime with respect to aviation turbine fuel, which increases the cost by up to 60% above international benchmarks.

This is as a result of the high taxation structure, comprising 10% customs duty, 8% excise duty and sales tax. The sales tax is set on a state-by-state basis and can range from 4% to 30%. Examples of current state sales tax rates on aviation turbine fuel are presented in the following table.

| State                              | Sales Tax on Aviation Turbine Fuel |
|------------------------------------|------------------------------------|
| Andhra Pradesh                     | 16% (recently increased from 4%)   |
| Kerala                             | 4% (reduced from 39%)              |
| Maharashtra (except Mumbai, Pune)  | 4%                                 |
| Delhi NCR                          | 20%                                |
| Maharashtra (Mumbai and Pune only) | 25%                                |
| West Bengal                        | 25%                                |
| Karnataka                          | 28%                                |
| Tamil Nadu                         | 29%                                |
| Gujarat                            | 30%                                |

Airlines have been lobbying for aviation fuel to be classified as a declared good, which would mean a flat sales tax of 4%. This step alone could save the airlines INR2500-3000 crores per annum. However, the central government has not yet been able to secure national consensus on this issue.

## **Fiscal Regime**

Although the sales taxation on aviation turbine fuel is the most pressing issue for Indian carriers, there are a number of other fiscal matters that also generate a significant impost for the industry:

- Withholding tax on aircraft leases can increase rates by up to 10%;
- Service tax on First and Business Class fares impacts the sale of premium seats.

## **Airport Infrastructure**

Congestion at airports, both on the ground and in the air, has resulted in significantly increased costs for Indian carriers. The inability to schedule faster turnarounds, the need to carry increased fuel and spend more time in holding patterns has resulted in inefficient operations. The airport modernisation program that is underway is certainly delivering improvements, however in the interim further inconvenience is incurred due to runway closures and terminal developments. Furthermore, the huge capital expenditure programs are being funded through increased charges, either levied on the airlines or the passengers themselves. In the latter case, the fact that the ticket price is increased through Airport Development or User Development Fees means that demand may be affected. However, over the next couple of years, as the upgrades are completed, the quality of infrastructure should largely cease to be an issue.

## **Human Resources**

The shortage of skilled resources is major challenge for the airline industry. India has very poor infrastructure for aviation education and training, with limited high quality courses either for management degrees programs or vocational activities such as pilot training, cabin crew, engineering etc. Students that graduate from the programs that exist are often ill-equipped for the roles for which they are hired. It is estimated that there are up to 4,000 Commercial Pilot License holders that are unemployable due to the poor quality of training imparted, or because the training academy did not screen applicants prior to enrollment. For recurrent or upgrade training, airlines are faced with the choice of either conducting courses in-house, or sending employees overseas, neither of which are ideal options.

In addition, Indian carriers are competing with airlines from the Gulf and Asia that have been targeting the same pool of personnel, while management and marketing executives, as well as cabin crew have had alternative employment options in hospitality and service industries due to the buoyant Indian economy. As a result, during the last boom, staff turnover and salaries climbed sharply, and a similar situation is likely to arise again as the industry resumes its rapid growth path.

## **GENERAL AVIATION**

General aviation has been a neglected sector of the industry, frequently in the shadow of the commercial sector. With the Indian economy set for strong and sustained long term growth, we can expect to see the general aviation sector in India undergoing a dramatic transformation in a very short period of time, however some key challenges remain:

- Absence of dedicated general aviation terminals, heliports and fixed based operations, means that the quality of the general aviation product is below what it could be;
- Restricted timings at key metro airports and lower priority clearance relative to commercial traffic (eg. no GA movements permitted at Mumbai Airport during peak hours), limits the utility of private travel;
- Limited night landing facilities exist at smaller airports;
- Lack of hangar space and parking bays increases the need for ferry flights resulting in increased costs;
- Limited facilities for maintenance, refurbishment and re-configurations, which results in aircraft having to be sent overseas at significant expense;
- Aircraft imported for private use are subject to an effective import tariff of 24.26%, comprising customs duty of 3%, countervailing duty of 16% and special additional duty of 4%.
- Obtaining permission to operate at civil enclaves can be a lengthy process which limits the advantage of private transport which should provide greater flexibility and spontaneity in travel scheduling;
- Severe shortage of skilled pilots and engineers, frequently more so than in the commercial sector due to the greater variety of aircraft types in operation.
- Although there is increasing recognition of the role of the sector by the Ministry of Civil Aviation, the demands of the scheduled sector mean that the general aviation industry is likely to receive less attention to its specific requirements.

## REGULATORY FRAMEWORK

### Aviation Policy

Although there has been significant liberalisation in the last 5 years, airlines still face a number of regulatory challenges:

- **Foreign Direct Investment:** Overseas carriers are still prevented from holding any stake in Indian airlines. This prevents the industry from gaining access to investors with a strategic interest and the ability to impart global expertise.
- **Route Dispersal Guidelines:** Domestic carriers that operate on trunk routes between metros must deploy the equivalent of 10% of such capacity on designated routes to remote areas. Airlines consequently find themselves operating uneconomic services to comply with this regulation. Alternative models could be considered which may better achieve the objectives of providing connectivity to underdeveloped regions but on a commercially sound basis.
- **Bilaterals:** The liberalisation of bilaterals in recent years, which provides increased access for foreign carriers to Indian cities, is generating increased competition for Indian carriers. This is particularly the case in non-metro cities which are seeing increased services by foreign airlines. By taking traffic from non-metros to an offshore hub from where the passenger can connect to a global network, means that metro Indian airports can be by-passed.

- There is a need to better align policy with industry requirements. At a recent CEO Conclave hosted by CAPA a key concern was that policy is based on an outdated 1934 Aircraft Act and new measures are introduced with little or no industry consultation.
- There is a need to restructure the framework so that there is an independent and expert regulator that keeps in mind industry viability in its thinking.
- Financial incentives could also be considered for stimulating air taxis and general aviation. These are ultimately the building block of a comprehensive aviation system with greater reach.

**Restructuring of the Ministry and DGCA:** As aviation becomes an increasingly important sector of the Indian economy, consideration must be given to developing an aviation policy and governance framework that is aligned with the needs of the industry. The focus should be on creating an environment that is equitable, efficient, transparent and in the national interest, and strengthening the technical and policy framework. The institutional and regulatory environment needs to be sculpted to support the growth of the industry from 2010 onwards. The current Director General is indeed proceeding strategically and quickly to bring Indian regulations in line with international standards, with a key focus on safety.

At present the Ministry of Civil Aviation is responsible for both policy formulation and regulation. A possible alternative model to follow would be the UK Civil Aviation Authority which is funded by the key stakeholders in the industry, is responsible for both technical and economic regulation, and rather than being a civil service department, is run independently by the leading specialists in their field. Such an approach would relieve the Ministry of Civil Aviation of its regulatory responsibilities, allowing it to focus on policy development to facilitate long term growth, and setting a vision for the sector with a 10-15 year Masterplan. A consultant has been appointed to study the available options and is due to submit its report shortly.

**Renewed Focus on Safety:** There is a clear desire by the DGCA to modernise itself and overhaul the regulatory framework to support the Indian aviation sector of today. Significant steps have already been taken – in fact, the measures implemented which resulted in India clearing the FAA audit in Sep-09, were remarkable and are recognised globally as a clear indication of a committed and highly capable regulator. However, CAPA believes that more attention and resources are still required in order to build a robust safety network and more importantly a safety culture.

The Directorate General of Civil Aviation needs to be adequately resourced and trained to focus on technical regulation, with a strengthened capability in managing safety and air worthiness, and the ability to act in an independent and transparent manner. Indian aviation must have safety as a paramount objective. Apart from being an ideal in its own right, it is essential for the long term growth and reputation of the industry, the country can ill afford a mishap at this nascent stage of its development.

## CHALLENGES FOR AIRPORTS

### Airports Authority of India

- AAI is currently focused on capex and needs to become a more commercial, management driven company. It is also a highly complex organisation, with over 100 airports to manage, which may need to be broken up into smaller groups that are more viable eg. during the commercialisation process in Mexico, 35 airports were grouped into 4 geographical zones with independent management.
- Some airports which are loss making may be better handed over to state governments as the economic benefits of the airport to the state may outweigh the operational losses. However, this approach may lead to greater conflict between the state and the centre.
- A fundamental driver of airport viability is traffic volumes. If a greater number of Indian airports are to be successful, the policy framework must encourage re-distribution of traffic beyond the 10 largest airports consisting of the metros, non-metros and Kerala. The regional airline policy was designed to do this but has not succeeded so far as a result of which it may need to be revisited to make it more relevant. In addition, the landing and parking concessions for aircraft with less than 80 seats are a revenue issue for airports;

### Private Airport Concessions

- The concession models at Delhi and Mumbai have resulted in very high bids for revenue share to the AAI at 46% and 37%. These commitments potentially jeopardise the viability of the airports and could force a dramatic increase in charges for stakeholders, unless there is a profitable real estate component. The burden could fall on airlines and ultimately consumers.
- A more appropriate model might have been one that incentivised world class infrastructure but on a cost effective basis. IATA has long rallied against “gold plated” airports, calling for fit for purpose facilities that are reasonably priced. The modernisation of Toronto Airport for example came in for significant criticism due to the significant hike in charges. The global trend in recent years has been towards lower cost airports.
- The greater interests of the industry may have been served by not necessarily the highest revenue share bid, or at least a lower rate during the first 5 years when capex is high.
- Airports cannot be built in a vacuum. There needs to be seamless coordination with other state agencies to develop ground transport and logistics to provide surface connectivity. The delays in building the road to the New Bangalore Airport for example resulted in negative implications for the facility based on an issue that was beyond the control of the operator. A similar situation could arise at Navi Mumbai, which given its distance from the city could be a disaster without the Sea Link and high speed rail.
- Airport planning needs to take greater responsibility for coordination and viability of different airport projects within similar catchments.
- We must ensure that in the next stage of modernisation the objectives of airport development are clearer, to ensure that the outcome is better aligned with requirements.

**Airports Economic Regulatory Authority:** In order to build a modern, world class airport system in India, almost USD30 billion of investment will need to have been committed in the 15 years through to 2020. The government acknowledges the important role of the private sector, but in order to attract its participation, the first prerequisite is an economic regulatory framework which provides clarity and certainty to investors on the commercial potential of any specific airport operation. The absence of a clear set of guidelines for airport operators ensures that their revenue models remain subject to national debate and controversy. Resources are allocated inappropriately, further reducing investor confidence in future projects, denying India access to critical expertise and capital. The end result would be under-construction – and, ultimately, continued suppression of economic expansion and consumer benefits.

The government first stated its intention to establish the Airport Economic Regulatory Authority (AERA) more than 3 years ago. AERA is to act as an economic regulator for all airports with traffic of more than 1.5 million passengers per annum. There are 11 airports in India which exceed this threshold, representing 85% of passengers handled nationally. AERA's scope is to set aeronautical charges on a 5 year cycle, taking into account the economic viability of an airport, in line with ICAO principles of transparency, cost-relatedness, non-discrimination and user consultation.

This will be based on a determination of the costs of delivering aeronautical services in an efficient manner and to a desired level of service, including both capital expenditure and operating activities. The regulator will also determine whether User Development and Airport Development Fees are appropriate and will monitor service and quality standards. AERA has been established, however it is still expected to be some time before it is fully operational.

## **MRO**

Until recently, the relatively small fleets of Indian carriers did not provide the economies of scale required to establish locally based heavy maintenance facilities. With the large aircraft orders that have been placed by India's airlines, this situation can be expected to change over the coming years.

In theory, India-based MROs could provide significant cost savings for local carriers, not only because of the reduced travel time, but also the potential to access lower labour costs. In fact it has been suggested that a high quality, low cost MRO industry in India could competitively service airlines from other regions, in the same way that China has succeeded in attracting offshore work.

However, the current taxation structure that applies to the sector is a major hurdle to developing a competitive industry. Aircraft maintenance in India is subject to a service tax of 12.36% and VAT of 12.5%, which airlines do not pay to overseas MROs. In addition, imported spare parts are subject to a customs duty of 3%, countervailing duty of 16% and special additional duty of 4% resulting in an effective import tariff of 24.26%. In certain states such as Maharashtra, an octroi tax of 4% may still apply in some municipalities, however this tax is expected to be phased out in due course.

Furthermore, despite the fact that India has a large pool of skilled engineers that graduate each year, demand currently exceeds supply and salaries have been increasing quite sharply, diminishing the cost advantage.

## THE ENVIRONMENT

There is now unanimity that carbon emissions are a real threat to humanity – the debate is largely on the timeframe and intensity of impacts. Irreversible thresholds risk being passed if immediate action is not taken. The problem is real and must be addressed.

Aviation contributes 2-3% of global carbon emissions, but given the importance of this issue, every industry must take responsibility for reducing emissions. Management and employees of all organisations must understand the climate change implications of their activities, and how they can contribute positively.

The aviation industry must be pro-active, otherwise there is a risk that governments may impose irrational restrictions. Some of the key challenges for the industry will be to incorporate IATA's Four Pillars Strategy:

- Technology Solutions: which are expected to have the greatest impact and involves aircraft design; use of composite materials; innovation in engine types; alternative jet fuels; use of winglets; induction of newer more fuel efficient aircraft;
- Infrastructure: consisting of improved coordination between air navigation service providers; greater coordination between civil and military airspace; implementation of continuous descent and gate to gate management procedures;
- Operations: fuel conservation through weight reduction strategies and optimisation of aircraft take-off and landing procedures;
- Economics: emissions trading schemes based on industry quotas, provided that it is a global and open system that can trade with other industries.

Addressing greenhouse gas emissions will require an integrated approach by airlines, airports, aircraft and engine manufacturers, ANSPs and fuel companies. IATA has set the following targets, which Indian aviation must also aim to comply with:

- Annual fuel efficiency improvement of 1.5% per annum;
- Carbon neutral growth from 2020 onwards;
- Aspirational goal to reduce emissions by 2050 by 50% from 2005.
- Carbon neutral growth means that CO<sub>2</sub> emissions would peak in 2020 and would stabilise or decline after than even though traffic would continue to grow.

## AIR TRAFFIC MANAGEMENT

We can have the best airports in the world, however this is only half the story with respect to achieving safe and efficient operations. The other key issue is airspace. As noted in Chapter 1, the AAI has developed a Future Indian Air Navigation System Masterplan, however the need to build seamless airspace with augmented capacity whilst addressing challenges such as the environment, implementing a safety culture and civil-military cooperation, will require significant and continuous investment. This may require an entirely new way of thinking with a fresh approach and an organisation that is focused not only on technology and equipment, but also people and training. Based on international experience, corporatisation of the Air Traffic Management division could be the way forward. However, it is also the case the process of change is neither easy nor rapid and requires commitment from the highest levels of government and tenacious focus by the leadership.

## CHAPTER 3: The Future of Indian Aviation

After a turbulent couple of years, 2010 should be a more positive year for Indian aviation, provided that the airlines can remain disciplined on costs, capacity and pricing. We project the following key themes for the year ahead:

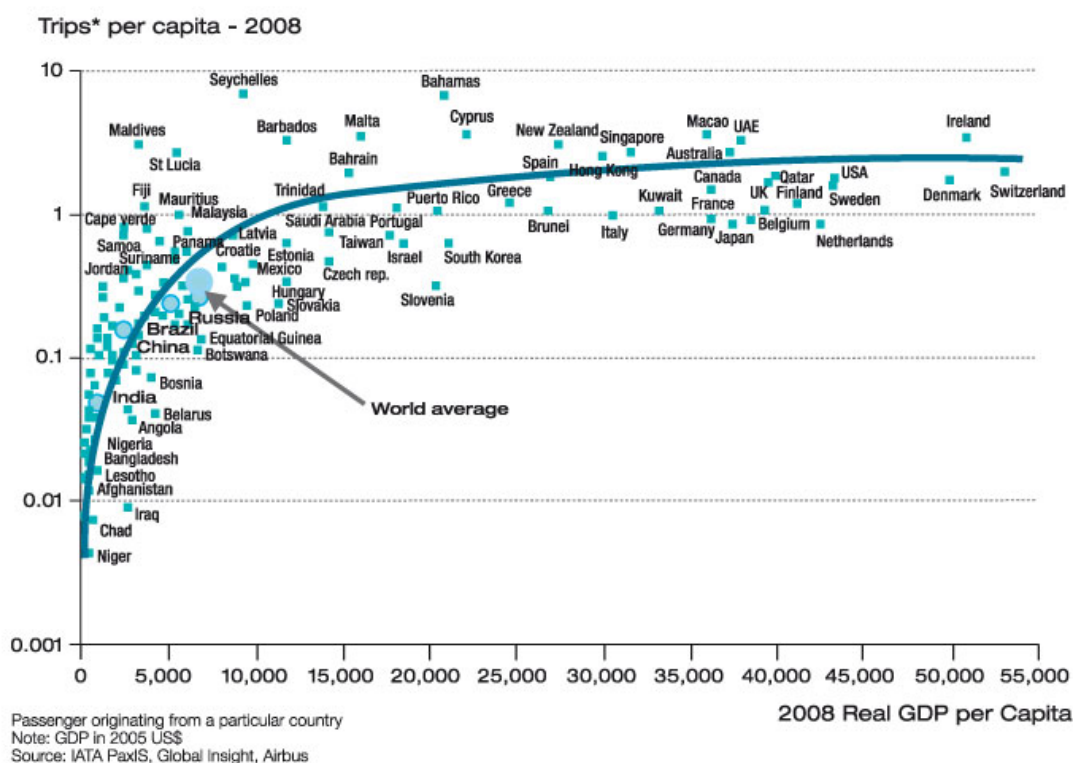
- **Domestic Traffic:** Domestic traffic is expected to post expansion of 15% or more in 2010/11 as the industry returns to its long term growth trajectory. This is higher than the expected increase in capacity of just under 10%, which should assist carriers in achieving higher load factors and improved yields. It will be important for airlines to maintain capacity discipline and to keep control of costs, especially since fuel prices remain the great unknown and which continue to remain a constant threat to the industry. Airlines should not allow growth to distract them from focusing on restructuring their operations and profitability;
- **LCCs:** The domestic market may become almost entirely low cost, as Jet Airways and Kingfisher Airlines transition to a largely all-economy model – Jet and Kingfisher could end up the largest LCCs in the market. However, the lead performer in the market is expected to be IndiGo which has maintained the best focus on operational performance and costs;
- **International Traffic:** International traffic (which has remained positive even during the downturn, particularly outbound travel) is expected to grow at 10-12%. Yield in both economy and premium classes are expected to be firmer. Premium volumes and revenue overall are likely to recover faster ex India as opposed to inbound.
- **Financial Performance:** The airline industry will return to profitability, although it will be some time before the accumulated losses of recent years are reversed. The private carriers (ie. excluding Air India) are expected to achieve a combined profit of US\$250-300 million in 2010/11;
- **Debt:** The 3 large airline groups – Air India, Jet Airways and Kingfisher Airlines – have a combined debt of approximately USD10 billion. De-leveraging their balance sheets is a primary objective. They will require capital raising of a further USD10-12 billion over the next 2-3 years to finance aircraft deliveries.
- **Yields:** CAPA expects that domestic yields will increase by 5-7% in 2010/11 and possibly by as much as 10% in Q3 of next year, which will be the most profitable. Maintaining yields will be key and it was the loss of focus on this parameter that has contributed to the industry's current difficulties.
- **Consolidation:** Consolidation of airline operators is both desirable and inevitable, and market exit is also possible. SpiceJet will be a key player and is likely to be involved in any developments. Jet Airways will be open to opportunities which would allow it to once again dominate the domestic market.
- **Cooperation:** The airlines must continue to lobby the state and central governments to have ATF designated as a declared good in order to reduce the sales tax. This major impost is a significant barrier to industry viability and growth. The Federation of Indian Airlines and the

Indian Association of Private Airport Operators must cooperate to reduce the high structural costs faced by the industry.

**Vision 2020**

Looking forward to 2020, the upside potential in Indian aviation is massive. India has barely embarked upon its growth path. Despite the recent expansion, the fact remains that less than 2% of Indians fly in any given year. The number of trips per capita is low even by the standards of other developing countries. For example, India’s domestic market is about 1/5<sup>th</sup> the size of China’s despite having a population that is only 10% less.

**Trips Per Capita in Global Markets**

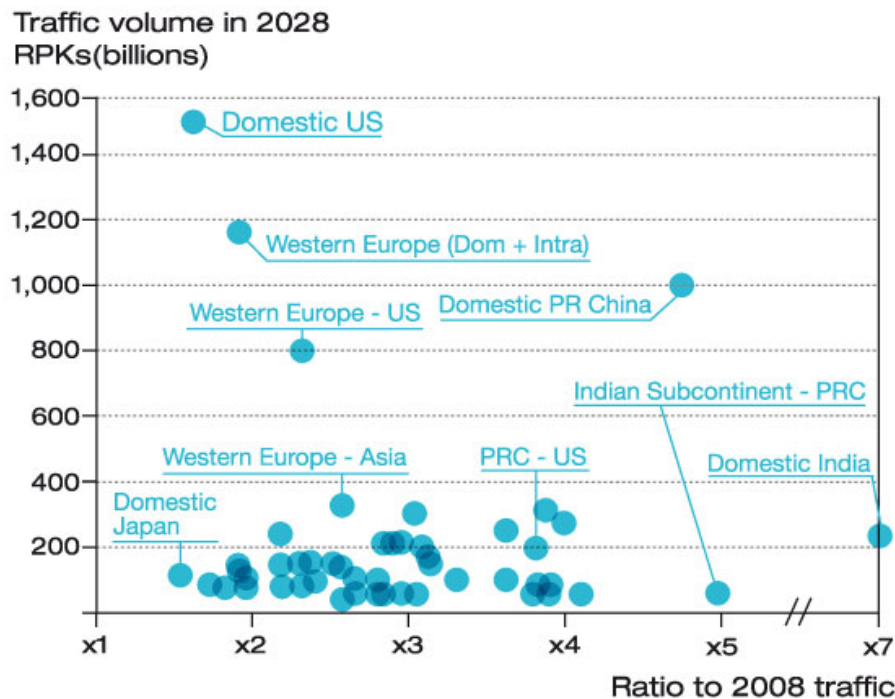


**Domestic Traffic Data for 2008/09 in Selected Markets**

|                  | Population    | Domestic Traffic | Trips per Capita | GDP per capita |
|------------------|---------------|------------------|------------------|----------------|
| <b>Australia</b> | 21 million    | 50 million       | 2.38             | \$38,100       |
| <b>USA</b>       | 307 million   | 650 million      | 2.12             | \$46,900       |
| <b>Malaysia</b>  | 26 million    | 14 million       | 0.54             | \$15,200       |
| <b>Brazil</b>    | 199 million   | ~50 million      | 0.25             | \$10,200       |
| <b>China</b>     | 1,339 million | 198 million      | 0.15             | \$6,000        |
| <b>India</b>     | 1,166 million | 39 million       | 0.03             | \$2,900        |

Source: CIA World Fact Book; FAA, DGCA India, CAAC, Malaysia Ministry of Transport, BTRB Australia, ANAC Brazil.

In light of the low base from which it is developing, several industry forecasts expect India to be the fastest growing market in the world over the next 20 years, with Airbus, Boeing and Airports Council International projecting average market growth of 10% per annum over the this period. Airbus forecasts that the Indian domestic market will grow 7x in the next 20 years.



Meanwhile, based on Airports Council International forecasts, India will be the 3<sup>rd</sup> largest aviation market in the world by 2027. CAPA projects that the growth rate could be much higher than anticipated in the early part of this period, particularly through to 2020.

So, what will Indian aviation look like in 2020?

- CAPA estimates that by 2020 domestic traffic will reach 160-180 million pax per annum and international traffic will exceed 80 million. This will require investment of up to US\$120 billion in aircraft (commercial fleet size expected to reach 1,000 from 380 today), airport development and ancillary services such as ground handling, ATC, MRO, catering and training;
- There is likely to be a market for up to 1,000 general aviation aircraft by 2020, including fleet renewal, with an estimated investment of US\$4 billion;
- A total of US\$20bn investment will be required in the airport sector over the next decade, in addition to the US\$10 billion already committed in the last 5 years. In addition to upgrades, greenfield second airports will likely be developed at various metro and non-metro cities. The airports system may be handling over 400 million passengers per annum by 2020;
- Investment of up to US\$5bn will be required in developing world class ground handling, cargo and logistics facilities, including high-output distribution centres at major airports;

- There will be significant investment opportunities in the MRO sector with the potential to service a fleet of 1000 commercial and 500 general aviation aircraft, as well as competing for offshore work;
- Major additional investment opportunities will also arise in training, safety, security and ATC.

The potential for the Indian aviation industry is very exciting. However, the pressures on the system will also be immense whether the other 98% of Indian start to fly. Government and industry will need to work together to address issues such as:

- Creating a transparent and supportive regulatory regime;
  - Developing an equitable fiscal environment (eg. tax on fuel);
  - Investing in appropriate airport infrastructure;
  - Building an efficient airspace and air traffic management system;
  - Training the workforce that will drive the industry;
  - **AND** pursuit of an environmentally sustainable growth path.
-

## **CHAPTER 4: The Role of IT in Aviation – A Global Perspective**

### **Introduction**

Technology has been linked to the aviation industry ever since the first flight—as a key enabler for communications, business innovation and even business models. For example, in the 1940s, there were no international telecommunications networks in many parts of the world, so airlines set up their own private High Frequency radio networks. In the 1950s, the air transport industry began using teletypes to handle messages using an international standard code (Type B). And in the 1960s, the industry introduced the first fully-automated reservation system, along with a core high/medium speed computerised switching centre, which would form the backbone of the new SITA network.

This set the stage for the worldwide integration of computers and telecommunications into the air transport industry—and laid the groundwork for the essential role that information technology (IT) continues to play in the industry today.

### **A powerful force for change, innovation and growth**

With the introduction of affordable, portable personal computers and the widespread adoption of the Internet, IT has ushered in a new information age in aviation. And it continues to serve as a powerful force for change, innovation and growth.

For example, through technology such as flight operations solutions, which can help airlines plan flights, manage crews, and access real-time weather information—as well as solutions like aircraft emissions manager, which addresses compliance with emissions trading schemes— IT can help the Air Transport Industry (ATI) adapt to today's constantly changing environment. This includes everything from economic upturns and downturns to changes in routes, capacity and passenger numbers to mounting pressure to reduce the industry's carbon footprint.

In fact, in recent years, IT has gone well beyond its traditional role as an infrastructure cost to become a strategic tool that can help both airlines and airports reduce operational costs.

Passenger self-service is playing an increasingly strategic role across the industry and is moving from being an alternative to a primary channel. Airline kiosks are now offering the travellers a variety of functions including ticketing, flight check-in and printing boarding passes and hold great promise in future. Internet holds great opportunity for Airports to drive efficiency and customer friendly regime with reduced cost structure. For example, a new Passenger Services System (PSS) e-commerce platform helped Malaysia Airlines boost its online ticket sales from 4% to 30% of total sales from March 2008 to September 2009 alone. In addition, a global Internet Protocol (IP) Virtual Private Network (VPN) solution has helped Air China, the country's biggest airline, save 35% as compared to previous network costs.

Meanwhile, Baggage Management Solutions from SITA alone continue to decrease transfer baggage problems by 10 percent and local baggage issues by 15 percent—helping save the industry US\$100 per mishandled bag. With an average of nearly 70 million mishandled bags forecasted annually by 2019, these savings are significant.

Technology has changed the balance of the relationship between airline and passenger in favour of the passenger. As a result, airlines need to re-think their approach to putting the customer at the centre of their world. And that means mastering IT in new ways.

In recent years, both passenger processing and services, and improving customer service, have been key elements highlighted for airline investment. However ‘reducing costs’ has consistently topped ‘customer service’ in the list of drivers. Now there is concern that cost measures may have hindered service improvements that take advantage of the new technology lifestyle of passengers. It is now possible for passengers to handle every part of their “pre-flight” journey automatically using new technology.

The airline’s relationship to the passenger and the passenger’s technology is critical to the success of any customer service strategy. The truth is that brand-loyal travellers are rapidly disappearing as their ability to define their own travel plans through a variety of technology-driven media provides them with greater choice and power. The mindset has reversed – passengers increasingly expect the airline to show loyalty to them before they are prepared to show loyalty to the airline.

Up-to-date and accurate management information is critical to making sound business decisions. Given the complexity of every airport ecosystem – not least the number of support services provided by external contractors and the variety of airline customers – it is of utmost importance to have cohesive management systems that provide a comprehensive view of the business, IT facilitates it and support airports in achieving this objective.

It will take advantage of technology to ensure accurate, real-time sharing of data between Air Traffic Control, the aircraft, the ground operations and the terminal activities. The end result will see significant cost, environmental, safety and customer service benefits.

### **A paradigm shift from cost savings to generating revenues**

Even beyond cost savings, IT is rapidly becoming a platform to generate new revenues. This represents a major paradigm shift from the traditional role and definition of IT. For example, Common Use Terminal Equipment (CUTE) solutions for check-in and baggage management are attracting new carriers and foreign investments to the airports that offer them—while generating cost savings of up to 30%. And Airport Communications Solutions include innovative mobile technology offerings, which airport authorities can provide to all ground handlers and airlines.

At the same time, as airports and airlines all around the world face stronger competition and governments increasingly look at airports as potential revenue-generating enterprises, the industry continues to see a trend toward privatisation. And this is unleashing new opportunities for IT to help cut costs, boost efficiency, enhance the passenger experience, and help attract new investment.

For example, since 2004, India has transformed itself from an over-regulated and under-managed sector, to a more open, liberal and investment-friendly sector. This in turn has led to new opportunities for suppliers who can help modernise the airports through advanced technology,

provide solutions to current challenges such as insufficient infrastructure to handle growing passenger volumes, and put in place revenue-generating IT solutions.

As the ATI continues to transform itself, IT also remains a critical component in its ability to move over two billion people around the world safely and efficiently every year.

### **Driving transformation**

The past decade was a 'digital decade' for the ATI—during which the industry experienced three huge transformational IT waves:

1. The impact of the Internet and its 1.9 billion users. The ATI is the first truly web-enabled industry in the world—with online ticketing, check-in and other applications. By 2011, estimates show that customers will spend US\$ 128 billion on travel via online applications—in the US alone.
2. Secondly, an effort to simplify. This is a success story not just about the power of IT, but about working together as a community to deliver benefits such as e-ticketing.
3. Thirdly, the rise of e-commerce, which has revolutionised the ATI. In India alone, the online travel market is expected to grow at an average of 46% per year from 2007 to 2011. The e-commerce potential for all airlines continues to be enormous, with each airline's website serving as the first destination for potential travellers. Today, airline websites account for a substantial percentage of tickets sold online, according to SITA surveys.

The ATI is very different today from the way it was a decade ago—and IT has enabled much of that change. And it continues to drive major, lasting improvements that benefit all industry stakeholders.

### **Changing the way the ATI does business**

As IT continues to deliver value, efficiency and innovation to the industry, it's also changing the way the ATI does business. In fact, in some cases, airlines are building entire business models around IT solutions.

For example, low cost carriers, such as Europe's easyJet, are able to reduce overhead costs by cutting out travel agents and encouraging customers to book tickets via its website—which serves as the primary platform for interacting with customers.

Other carriers, such as Asia Pacific's Virgin Blue and Europe's Germanwings are increasingly taking on characteristics of hybrid carriers by using technology such as revenue management services to offer multiple fares available at any time, advanced ticketing procedures, multiple classes of service and other options that are typically only available through full-service carriers.

In the meantime, as airlines continue to consolidate and merge in response to mounting competitive pressures, they are using IT to bring different entities together to work as one. In this role, technology is helping to unite newly merged companies—providing a common platform to communicate, share common operational procedures and begin building a new culture.

IT is also continuing to force change by delivering new capabilities, which can help lower unit costs and improve the bottom line. Among today's emerging trends are cloud computing, virtualisation and software-as-a-service (SaaS).

- Cloud computing takes elements of a company's computer needs—from software applications to processing power and data storage—and processes them over the network as a service, rather than through an in-house IT system. This enables companies in the ATI to more easily deploy software to users, scale up or down to meet different IT service needs, lower their capital costs and access applications and services while on the move.
- Virtualisation involves creating a virtual (rather than actual) version of an operating system, server, storage device or network resource. This helps reduce capital costs, better optimise existing IT assets, decrease an organisation's environmental footprint with lower CO<sub>2</sub> emissions and simplify IT management, among other benefits.
- SaaS is a model for deploying software in which software providers license an application to customers on an on-demand basis, disabling it after the contract expires. This helps save on operational costs by sharing licenses within a company or with another party.

IT will also continue to play a major role in the way both airlines and airports handle their growing customer base by helping to process passengers in the most efficient and effective way, enabling better communications, contributing to more effective airport management and meeting changing communication and infrastructure needs.

### **Facilitating the ATI's evolving needs**

Moving forward, IT will also help the industry meet evolving passenger needs and stakeholder demands. For example, in today's 24x7, passenger-connected industry, quality service will increasingly include providing around-the-clock web booking and modifying, boarding pass printing, self-bag tagging, kiosk and mobile check-in and more.

As the world becomes more interconnected, governments will increasingly want to know more about passengers arriving in their countries before they have even left the departure airport—and will rely on airlines to ensure they get the information they require, when they need it.

In the meantime, as competitive pressures, regional harmonisation initiatives and market liberalisation drive Air Navigation Service Providers to improve efficiency and productivity, the latest digital technologies will redefine air traffic management. For example, the production and exchange of flight data messages, NOTAMs, aeronautical messages, weather messages and other important solutions are increasingly based on modern client/server or web technologies that demand efficient IP communications.

Outsourcing and Master System Integration are quickly gaining ground in the aviation industry, as both airlines and airports seek to reduce IT overhead and cut costs. For example, the Dublin Airport Authority recently awarded a major Systems Integration contract to provide its new terminal with fully integrated IT systems with all applications running on a common infrastructure. The implementation will ensure the highest level of cost and management control at the airport, while providing a state-of-the-art IT infrastructure.

Tunisair, the national carrier of Tunisia, completely outsourced its IT needs to international and local partners for 10 years beginning in 2008. In an increasingly complex and challenging IT environment, this enables the airline to focus on growing its core business, while working with a progressive partner to ensure it is deploying the very latest IT technology.

**In the future, IT companies will continue to deliver services and innovations that will drive major and lasting improvements for the global ATI.**

The IT services and innovations that are emerging now in the ATI, will position the industry for major and lasting improvements. For example, wireless infrastructure and systems will deliver ubiquitous wireless connectivity, bringing a step change in productivity in ground operations. Context-aware systems will provide intelligence to airport employees with digital handheld devices—improving ramp management, line maintenance processes and baggage management. And e-enabled aircraft will be linked to the IT ecosystem—as another ‘node on the network’, which will enhance employee productivity and efficiency and keep crew better connected to staff on the ground as they fly.

Even in the air, in-flight broadband communications will allow ‘digital’ passengers to stay connected as if they were on the ground. For example, emerging in-flight mobile telephony services on some flights enable passengers to use their own mobile devices to send and receive emails, exchange text messages and make and receive voice calls as they fly.

At the same time, the ATI will harness new technology to help manage ongoing challenges such as security and environmental sustainability.

According to IATA, since 2001, airlines and their customers have paid more than \$30 million for security measures. The fact is that security costs are now a normal part of doing business, and we can expect the cost to the industry to rise as more countries put in place stricter border controls.

This will drive continued demand for new community solutions, such as border management solutions, which help the industry achieve fast, efficient and secure compliance with new and changing government mandates—such as the complexities of passenger entry into the US and baggage reconciliation requirements. Technology is significantly improving the flow of passengers through airports. But bottlenecks remain. The spotlight is now falling on security processing, where there are opportunities to use new technologies and automation to streamline the entire journey to and from the aircraft.

From an environmental standpoint, new regulations and the ATI’s continued focus on environmental sustainability will also drive new innovation. In this context, IT will become a critical enabler for global measuring systems, enabling more fuel-efficient flight planning and making sure airlines, airports and air traffic management organisations interact in the most effective way.

## Conclusion

IT has come a long way since its humble beginnings in the ATI. While it reduces costs, drives efficiencies, creates value, generates new revenue opportunities and improves customer service, most importantly it remains a fundamental force for change.

Long thought of as an infrastructure cost, IT has now gone well beyond its traditional role to become a strategic tool that can help reduce operational costs, take advantage of new opportunities such as privatisation of airports and airlines and even generate new revenues.

As we move forward, one thing is clear—the most advanced IT technologies are already hard-coded into the very fabric of the ATI.

IT remains critical to matching the industry's needs to changing market conditions, enabling airlines and airports to scale up services in times of increasing demand and downsize quickly as demand falls. It also helps drive the changes needed for a more efficient and responsive global ATI.

At the same time, it is clear that the driving forces for tomorrow's technology will no longer come from within the industry, but from customers and their digital lifestyles.

In today's 'always-on' environment, air travel and IT have become so fused together that customers have no tolerance for disruption. Around-the-clock service demands around-the-clock technology, based on around-the-world standards. And the future will be centred on a whole new kind of user experience—in which technologies such as new mobile devices and services will play a key role.

For the air transportation industry, the future is about innovation—using powerful IT solutions as key enablers to improve services to customers, while at the same time optimising and improving their operations.

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## CHAPTER 5: IT Infrastructure in India - Market Survey

With the rapid growth in passenger and cargo traffic in the last few years, airports and airlines have been faced with unexpected challenges. IT solutions are being used in India to automate and speed up processes, reduce costs, introduce operational efficiencies and create distinct points of competitive advantage. However, the survey revealed that the approach to IT, and the extent to which it is embraced as a core strategic matter as opposed to an operational support tool, varies considerably by organisation. The qualitative survey, which took place in December 2009 and January 2010, encompassed Chief Executive Officers and Heads of IT across a cross-section of operators in the aviation industry.

| Airlines   | Airports   | Others  |
|--|--|---|
| <ul style="list-style-type: none"> <li>▪ <b>3 Full service carriers</b></li> <li>▪ <b>3 Low cost carriers</b></li> <li>▪ <b>2 Foreign airlines</b></li> <li>▪ <b>2 Cargo airlines</b></li> </ul> | <ul style="list-style-type: none"> <li>▪ 5 Metro airports</li> <li>▪ 5 Non-metro airports</li> </ul> | <ul style="list-style-type: none"> <li>▪ General aviation op</li> <li>▪ MRO</li> <li>▪ Bureau of Immigration</li> </ul> |

Traditionally, the aviation industry has viewed technology as an enabling function that was ultimately a cost centre. Decisions on identification and implementation of solutions were usually delegated to the relevant operational division, be it distribution or passenger handling, with limited coordination between departments.

Airlines and airports have in the past taken a reactive approach to technology, rather than identifying opportunities where IT can add value. This is changing, although in the case of airlines, full service carriers have generally been less nimble in adopting new technologies.

There is, however, an emerging recognition that technology can play a much more positive role in terms of increasing efficiencies, generating new commercial opportunities and improving the passenger experience. However, maximising the value of technology deployment, requires a much more holistic and strategic view at the very senior levels of management. Only once this occurs can an organisation make decisions with regard to technology selection that take into account issues such as integration with internal and external systems, scalability and adaptability.

The survey revealed that one of the issues that airlines and airports face is that there are too many options available when it comes to technology products. Evaluation and identification of the optimum solution is seen as challenging. There is a tendency for the division where the solution is to be deployed to select the most cost effective option, or the one that just meets current requirements. However, this may not be the technology that is best aligned with the overall strategic objectives of the organisation.

Systems should ideally be selected which can support company growth as well as advances in new technology. Replacing hardware and software because decisions were made on an ad hoc and fragmented basis, and not within a long term company-wide plan, can be expensive and disruptive. However, our survey suggested that a high level strategic IT plan is more the exception rather than the rule in Indian aviation.

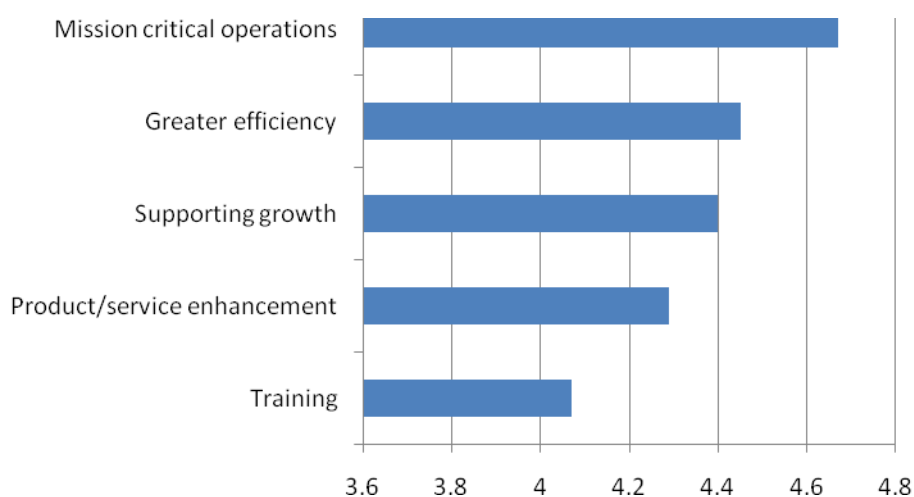
While exciting new front end technology such as mobile solutions and biometrics are generating a strong buzz, there is perhaps less management attention on ensuring that the organisation has a robust back-end IT structure. The ability to withstand traffic surges to the website, or to provide redundancy in the event that things go wrong, is often overlooked. And when all fails, there must be a recovery plan, not only to restore functionality, but also to ensure that staff are trained in manual systems to minimise disruption to passengers.

There is also a critical need to ensure that policies and procedures are in place to ensure data security and compliance with privacy laws, which may involve complex cross-border issues in the case of matters such as Advance Passenger Information Systems.

### Role of Technology

When looking at the result across all of the respondents, it is clear that the primary objective of technology is to support mission critical functions and to generate efficiencies. This has been the traditional role. “Softer” functions such as improving the passenger experience or supporting training for example, score lower. However, this may reflect a lower awareness of the value that technology can add in generating new commercial opportunities or saving costs. From an airport perspective, self service kiosks not only increase efficiencies with respect to staff requirements, but also reduce the terminal space required to process a given number of passengers. This can either support reduced capital expenditure on terminal floor area, or allow existing space to be converted for retail or other commercial activities.

### How Important a Role does Technology play for Various Functions



## IT Planning

The responses with regard to expenditure planning over the next 3-5 years ranged from “minimal” to “significant”. The overall philosophy appeared to be one where technology was seen as a solution to specific problems rather than as a core strategic issue. The focus tended to be on individual projects, whether it related to introduction of CUSS, RFID or mobile check-in. Only one airline responded that they were planning to evolve into an entirely IT-driven carrier. Although it could also be argued that with most airlines having launched services in the last 5 years, they have made investments in basic systems relatively recently and will not be reviewing these for some time.

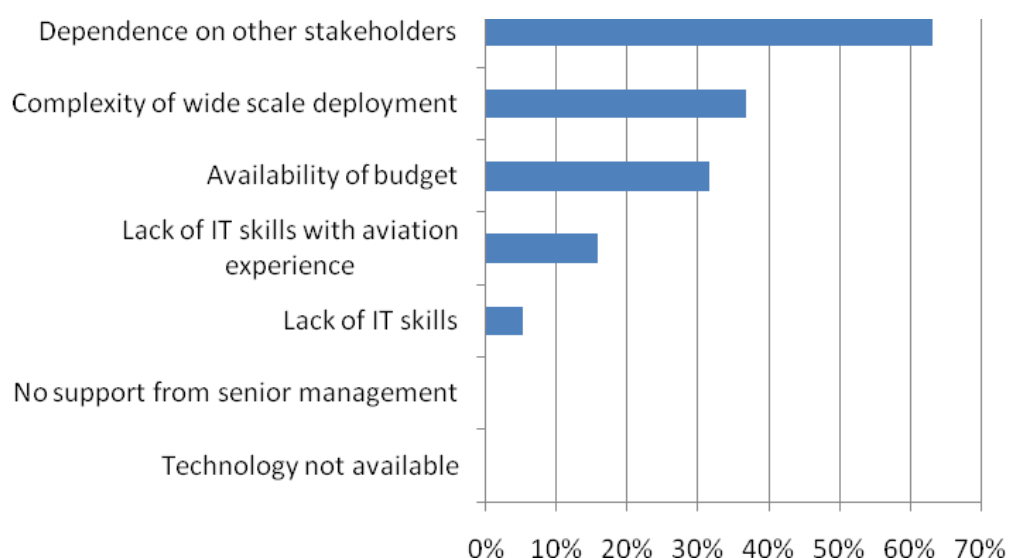
Airports that were undergoing major upgrades were more likely to see this phase as an opportunity to re-assess their IT plans. Integration of systems appears to be the key focus at present, and in the case of the Airports Authority of India, creating a centrally controlled solution for resource management across its multiple airports was a priority.

## Challenges

One key finding though, was that the close interdependence of the various components of the aviation value chain is the major obstacle to the implementation of individual corporate IT strategies. The multiplicity of platforms in operation, the global nature of the industry and the highly regulated nature of certain safety and security aspects means that deployment of new systems and processes is not straightforward and requires cooperation between multiple parties. This complexity and interdependence are the primary challenges.

Budget is of course a perennial issue in all businesses to some extent. The absence of skills or appropriate technology does not seem to be a hurdle, if anything the industry is struggling to keep up with the pace at which technology can deliver rather than vice versa.

### Key Challenges to Implementation of IT Strategy



## Outsourcing

Amongst airlines and airport interviewed, the respondents were generally very open to outsourcing of technology development and implementation, particularly in non-sensitive areas. The consensus appeared to be that if the quality was good, with strong service level agreements and there was a cost advantage, there was no philosophical objection to the concept.

Amongst airlines, LCCs had a greater preference to minimise their headcount operate lean IT departments. The fact that they are also relatively young and launched services at a time when outsourced solutions were available makes them more inclined to use such facilities. Legacy carriers are more likely to have developed in-house capabilities over the years. One full service carrier commented that in India there was not necessarily a cost advantage to be gained through outsourcing, however one of the benefits was that it allowed the airline to focus on its core operations. The requirement for aviation domain expertise is dependent upon the nature of the solution.

## Airports

Interviews were conducted with Airport Directors at Mumbai, Delhi, Bangalore, Hyderabad, Cochin, Kolkata, Chennai Lucknow, Nagpur and Ahmedabad, providing a cross-section of facilities with respect to size and ownership.

In terms of the drivers for investment in IT, the airport sector is primarily concerned at this stage with compliance and efficiency measures, aimed at reducing costs. There is as yet lesser emphasis on the potential for deploying technology as a point of differentiation and to enhance the customer experience, creating opportunities to generate incremental revenue.

### **Average Rating of Drivers for Investment in Technology at Airports**



With respect to the activities where investment is being directed, the key focus areas are safety, security, processing and operations, which corresponds with the finding that the primary drivers are cost and compliance related. Technology spend in commercial areas, general infrastructure upgrades, business support and environmental initiatives has a lower priority at present.

### Priority Areas for Technology Investment at Airports



The 3 leading trend which airports believe are likely to have the maximum impact on their IT infrastructure over the next 3-5 years include:

1. **Automated Tracing of People/Objects:** this encompasses both RFID and biometric technologies for security purposes, border control, baggage tracing and asset management;
2. **Electronic Documents:** e-documents providing single point information systems with passenger details, such as mobile applications, or frequent flyer smart cards, will be able to support faster, safer and more customised passage for travellers;
3. **Next Generation Aircraft Operations:** technologies are expected to be introduced to optimise airside resource management, creating additional capacity from existing assets, mimimising delays and reducing waste.

### Integration

In order to drive efficiencies in airport operations, there is a need for greater data transparency and exchange among the stakeholders. The newer and modernised airports have been investing in setting up a common platform where most of the agencies such as airlines, ground handling companies and retailers can be integrated to create a central database. The objective is to create an IT infrastructure where other operators at the airport can just 'plug n play'.

## **Ancillary Revenue**

Airports appear to give low priority to the opportunity to use technology to generate ancillary revenue. They appear to see the task of generating additional spend from passengers as being the domain of other agencies such as airlines, retailers and concessionaires. However, some airports which have made efforts to develop a common Standard Operating Architecture platform, are looking at the opportunity to provide IT consulting services to external agencies to integrate with the central database.

Based on current status of development, Indian Airports can be divided into three major categories offering different levels and types of opportunities for IT companies.

- Category 1: Privatised airports – Delhi, Mumbai, Bangalore, Hyderabad and Kochi;
- Category 2: AAI Metro and Non-Metro airports being modernised;
- Category 3: Other Airports.

## **Privatised Airports**

The private airports account for almost 60% of traffic. Stand alone and integrated IT solutions (where available) have been implemented by operators to enable streamlined internal communication, effective resource planning and utilisation on both airside and landside, baggage check-in and screening and data management.

### **Current Areas of Focus:**

- Passenger processing and services: Most airports interviewed for this study have implemented CUTE systems to facilitate passenger movement. Private airports have also invested in implementing CUSS and Bar Code Reader technology to further improve passenger processing systems. Service oriented architecture (SOA) has taken precedence over other design approaches. Plans to roll out smarter departure control systems are also in the pipeline. There is however still a belief by some carriers that in a low cost labour market such as India, there are limited gains to be achieved from replacing manual processes with technology.
- Baggage Processing: Airport have installed an in-line baggage screening system to facilitate quicker processing. Some private airports have also implemented baggage reconciliation systems and plan to implement solutions such as Baggage Tracer to further improve both the passenger and airline customer experience at the airport.
- Internal Communication: Wireless handheld devices are being used extensively by private airports for internal communication. Employees at all levels have been trained and are successfully using the technology. Airport operators are also extending the reach of these internal systems to some other agencies that are involved in operational roles.
- Airside Operations: Airports are beginning to improve efficiencies in this area through investment in technology. For example, Hyderabad Airport has set up a Visual Docking

Guidance system which helps the aircraft dock at the requisite bay without the need for marshals to guide the aircraft. Other areas of IT automation include runway safety and asset control.

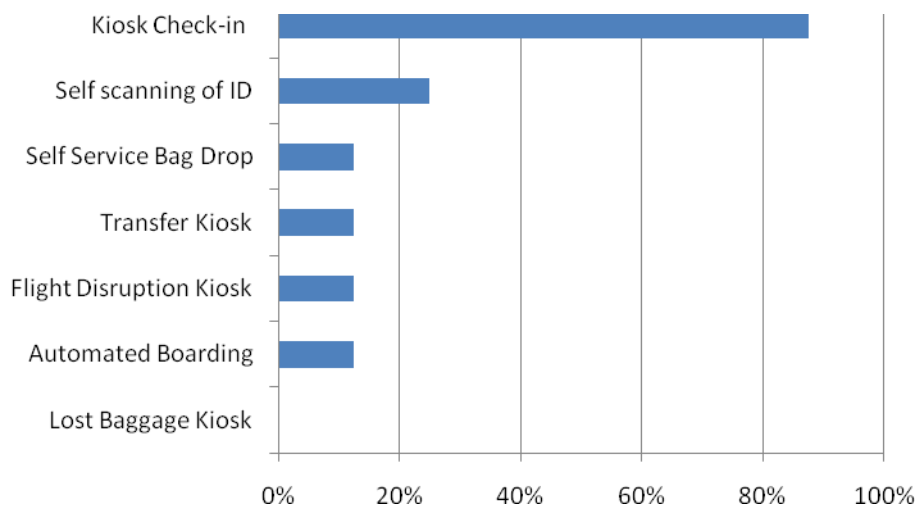
- Airport Operations Control Centre: In order to drive efficiencies in airport operations, there is a need for greater data communication between stakeholders. To facilitate this, airports have invested heavily in setting up an SOA platform for their Airport Operations Control Centers. However, the full potential of this data exchange is yet to be realised.
- Access Control: At any given time, staff from numerous agencies accessing secure airport zones on both the land and airtides. Investments have been made to better manage and monitor the control of people, especially in light of the heightened security alert. However, airport operators believe that current systems are still short of their requirements.
- Commercial Activities: Private airports have implemented Electronic Point of Sale systems (E-POS) in order to streamline the commercial revenue streams, and to improve the efficiency of logistics support, finance and accounting. Further automation to enable retailers to optimise management of their inventory levels is also planned.
- Self Service Kiosks: Most of the airports interviewed stated that they plan to leverage the investments they have made in self-service kiosks by extending their capabilities to include passport scanning and baggage tag printing.

#### **Future Areas of Investments**

- Flight Information Display Systems (FIDS): Private airports have already invested in state of the art digital flight information display systems and will phase out mechanical systems completely. There is strong emphasis on real time precise information displays to enhance the passenger experience at the airport.
- Centralised Information Studios: Airports plan to establish centralised information studios for flight information management, announcements and display controls.
- Radio Frequency Identification (RFID): At the new terminals being developed, plans are underway to introduce RFID tagging not only of baggage but also of other movable properties for real time resource tracking. However, at this stage, only one airport has a clear timetable for its introduction.
- Airport Operational Database Systems (AODB): Although live, exploiting AODB to its full potential is still a challenge for airports. Airports are ready to further invest in solutions which may result in direct commercial and efficiency gains for airports, airlines and other stakeholders.
- Mini control centers: Airports plan to establish mini control centers for airlines to leverage AODB and associated systems that are already in place at key locations.

- Passenger experience: In order to enhance the passenger experience at airports, investments in smarter technologies are on agenda in the short as well as medium term. Digital touch screen kiosks, GPS/GPRS technologies for directional support, smart cards holding complete information about the passenger, digital shopping and courier dispatch systems are expected to be in place in next 10 years.
- Passenger support: Initiatives to convert airport portals to integrated e-commerce platforms have already commenced. Airports also plan to invest in automated call center support for travelers.
- Mobile technologies: Investments over next 2 to 3 years are being planned to induct mobile technologies aimed at automating passenger movement and phasing out legacy systems.
- Biometrics: Airports are very keen to experiment with biometric identification systems and would like IT companies to play a critical role as facilitators. Automated vehicle identification, parking lot management, integrated boarding pass generation systems and self service baggage drop, are expected to be in-place within next 5 to 10 years, subject to receiving the appropriate security clearances.
- Integration Solutions: As airports have to simultaneously deal with airlines, security agencies, air traffic controllers, concessionaires and several other direct and indirect stakeholders, managing the information flow and control is a massive challenge. Multiple platforms are in place and as a result manual processes are often used due to a lack of integration between systems.
- Self Service Kiosks: Kiosks for lost baggage reporting, disruption management and self scanning of ID and passports could be introduced but in phased manner depending on extent of support from external agencies (particularly regulatory authorities). Moreover, the airport operators feel that majority of travellers are not technically literate enough to be able to use self service functionalities comfortably. As the travel market grows, there will always be a relatively large cohort of first time travellers in India for many years to come, hence there is likely to be a need to maintain a higher level of human interaction than is the case in more developed markets. The initial focus is on standard kiosk check-in. On other issues the airports appear to be as cautious as the airlines, except in the case of lost baggage kiosks in which airlines have a greater interest.

### Proportion of Airports Interviewed Planning to Introduce Self Service Facilities by end 2012



- **Others:** Instant data access for airlines; introducing and establishing an integrated, unified communications network; Airport Operations Control Centre integration with ERP are other major initiatives being planned by major airports in India.

#### **AAI Airports being Modernised**

The Airports Authority of India has an extensive plan for upgrading numerous airports. New terminal buildings are being developed to allow the use of technology driven systems as an integral part of their design.

##### **Current Areas of Focus:**

- **Passenger processing services:** CUTE systems are being installed at various airports under up-gradation.
- **Baggage processing services:** Inline baggage screening systems are being introduced at all airports under upgradation.
- **Airside Resource Management:** Improved navigation services are being introduced at all airports under modernisation. Airside resource planning and allocation systems are also being implemented at certain locations. Although introduced on a standalone basis, AAI will be investing in bringing such facilities under a certain degree of standardisation and central control.

##### **Future Areas of Investment Interest:**

- **Air & Land Side Support:** Airports Authority of India plans to introduce a web based Integrated Airport Management System (IAMS) at 27 selected airports in India, later on extending it to 72 airports, to improve the efficiency of resource use.

- Security: AAI is keen to work with security agencies to bring in a certain degree of automation in passenger screening beyond Hand Held Metal Detectors (HHMD) and Door Frame Metal Detectors (DFMDs) currently using three zone scanning technology.
- Passenger Information: Airports under AAI would like to have state of the art digital flight information display systems at all locations. Touch screen kiosks introduced at certain airports will also be made available at other airports in due course.
- Data & Communication Coordination Systems: Most of the systems installed at AAI airports do not contribute to real time data sharing. Investing in solutions that integrate and synchronise information from airside and landside systems is a key area of interest for AAI. It hopes to address this through IAMS to certain extent.
- Landside Resource Planning: Currently, almost all AAI airports have stand alone solutions in place. AAI however plans to significantly invest in a standardised solution that can be implemented across all airports, with the ability to customise depending on specific needs at different locations, and can be centrally reviewed and controlled.
- End-to-End State of the Art Technology Solutions: At locations where the control no longer rests directly under AAI, the best available solutions for specific purposes are being evaluated. At Nagpur for example, where a multi-modal cargo hub is planned, MADC plans to invest in a complete logistics support solution.

### Issues and Challenges

- Multiple Dependencies: Airport operators have to deal with up to 500 different stakeholders. Centrally controlling activities and information flow, and harmonising objectives are a major challenge for the sector.
- Real Time Data Sharing: The growth in the scale of operations and volume of traffic has put the spotlight on information management and its effective use. At any given time, multiple systems and numerous functionalities on different platforms are in use. To improve efficiency, greater real time data sharing is necessary.
- Integration: To enable real time sharing of data being generated by multiple systems using myriad platforms ***integration is by far the biggest challenge*** faced by the airport operators. As every airline uses systems best suited to its own operational and cost structure, it becomes extremely difficult and time consuming for both airlines and airports to integrate their systems and take them to a level where both stakeholders can draw some degree of advantage.
- Stakeholder Support: The desired support from regulatory and security bodies and their level of readiness are below desirable levels. It is extremely challenging for airports to introduce processing systems without external support and acceptance. Mobile, remote and self check-in did not get implemented due to the slow pace regulatory agencies, in addition to the reluctance of certain airlines to switch because of cost concerns.

- **User Support:** The Indian traveler, with the exception of a minority, has not attained required level of sophistication and comfort in using technology based service interfaces. However, gradually the travelers are expected to see technology driven interfaces as imperative and not impediments to better service. Currently available smart technologies may take another 5 years to deploy and use to their full potential.
- **Technology Issues:** RFID technology is being used for automating certain functions. However, there have been instances where tags have been mis-read or multiple codes have been generated. Although, such issues are promptly addressed and sorted out as the scale is not yet critical.
- **Maintenance & Service Support:** As the scale of technology deployment is extremely high at airports, provision of 24x7 maintenance and service support at times becomes a challenge. As airports believe in having lean organisational structures, dealing with multiple vendors itself becomes an issue.

### **Making Indian Airports World Class**

The key issues that were identified as being necessary to bring Indian airports to world class standards were:

- **Investment:** ultimately the core requirement is to devote capital expenditure to improving the physical infrastructure. This process is already underway, with more than US\$10 billion having been allocated to this over the last 5 years, and the results are starting to be seen.
- **Technology:** the limited investment in technology until recently means that the modernisation program is an opportunity to leapfrog to the cutting edge in terms of deployment of new solutions. In the same way that the telecoms sector has basically bypassed landlines and gone straight to mobile, so Indian airports can take steps to prepare for the latest generation in systems.
- **Cooperation:** smooth, efficient operations require greater coordination between the numerous agencies involved at the airport. This appears to be improving it is perhaps not happening fast enough. And as noted, there is a need for much greater integration at a technology level.
- **Soft Infrastructure:** efforts must be made to improve training of staff both from an operational and customer service perspective, to ensure that Indian airports can deliver a passenger experience that is on a par with the best in the world. And in this fast moving environment, there is a need to support employees in adapting to the rapid changes taking place.

### **Vendor Selection**

Almost all the airports governed and managed by the Airports Authority of India and private airports have identified similar criteria for vendor selection, such as:

- Cost effectiveness;
- Technical capabilities;
- Quality of support and service level agreements;
- Implementation and transition support offered.

## Summary

Airports in India are taking the necessary steps to leapfrog from their current state to meet international benchmarks. To date, most investments have gone into facilitation of better passenger and baggage processing. However, with the increase in the scale of operations, investments are now being made in technology to enhance airside resource optimisation and improve the integration and exchange of information between stakeholders. Self-service, RFID technology and biometrics are expected to be the key areas of future investment.

## AIRLINES

Airlines appear to be further advanced than airports in their embrace of technology as a strategic tool rather than a support mechanism.

There appears to be greater recognition of the role that technology can play in strengthening the brand, market positioning, enhancing the experience for premium passengers and generating new revenue opportunities.

This is evidenced by the fact that when faced with the same question as airports about the key drivers for investment in technology, the cost and revenue drivers were interspersed through the rankings, whereas in the case of the airports all the cost drivers appeared first.

### Average Rating of Drivers for Investment in Technology at Airlines

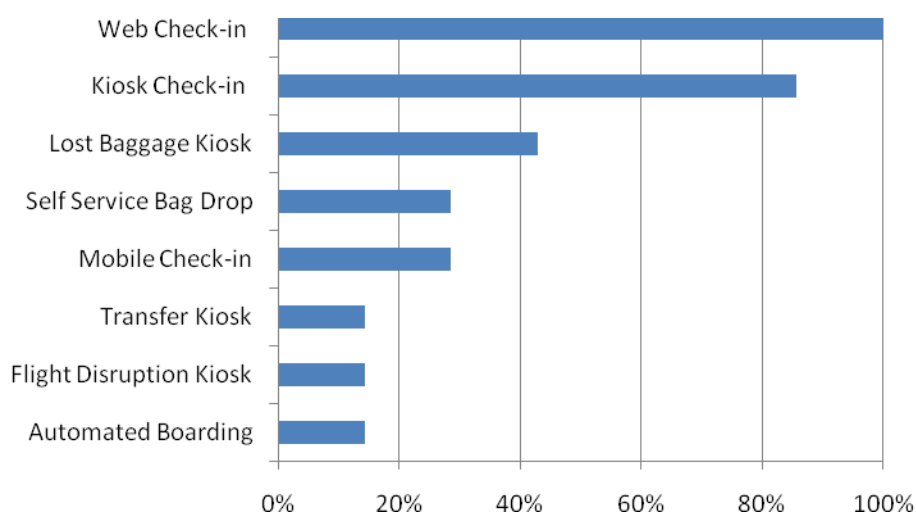


### **Key Offerings**

Most of the airlines interviewed have already deployed web check-in and kiosk check-in (at modernised airports). The next key focus area is mobile check-in once regulatory clearance has been received, which they believe will further speed-up passenger processing at airports. However, an area of concern is that there appears to be limited coordination and communication between airlines and airports on new technology implementation.

Although airlines have indicated that self-service is the way forward, with respect to future products such as kiosks for lost baggage reporting, flight disruption management, flight transfers, bag drop and automated boarding gates, these do not appear to be priority considerations at this time.

### **Proportion of Carriers Interviewed Planning to Introduce Self Service Facilities by end 2012**



### **Priority Investment Areas**

As noted above, passenger and baggage processing are the key areas of investment in IT at present. Mobile technologies, self-service and introduction of RFID have the most attention.

There is an emerging recognition of the role that IT can play in strengthening back-office support functions such as HR, finance, data analytics and even credit card fraud, however there is much more that can be done in these areas.

Airlines also acknowledge the importance of biometric solutions for passenger and employee security, however due to the cost involved, few have immediate plans to invest in such systems.

### **Ancillary Revenue**

Airlines generally and LCCs in particular, are increasingly focusing on ancillary revenues to drive profitability. The website, which is a primary point of interaction with the customer for LCCs, given the strength of the direct distribution channel, has the potential to create additional sales

opportunities through dynamic packaging options during the booking process. This is expected to be key area of attention and experimentation for airlines.

### **Passenger Sophistication**

Airline passengers in India today range from first time flyers to frequent corporate travellers, with a diverse level of technological sophistication. Mobile penetration is very high, with over 525 million phone connections, however airlines have indicated that for ease of use and cost minimisation, any mobile solutions will need to be standardised to be useable by a large proportion of travellers. Full service carriers indicated that they might consider delivering more sophisticated applications to their most frequent flyers through their loyalty programs.

As noted earlier, as income levels grow, new travellers will be travelling by air for the first time for many years to come. Today, approximately 98% of Indians do not travel in any given year. This means that there will be a reasonable proportion of travellers that are unlikely to be comfortable with a fully self-service environment, and manual alternatives will need to remain available – unlike in markets such as the US or the UK, where some airlines are moving to a completely self-service check-in model.

### **Full Service Airlines**

#### ***Current Areas of Focus:***

- **Passenger processing services:** Airlines have moved to using CUTE systems, and in some airports this is now mandatory. Bar code readers are being looked at as an alternative to manual processing of boarding passes.
- **Self Service:** Full service carriers, wherever possible, are investing in self-service facilities and would like to extend their reach beyond currently available options.
- **ERP & Cost Optimisation:** Airlines have channeled significant investments in implementing solutions for end-to-end enterprise resource planning in order to cut down redundancies, drive efficiency and productivity and ultimately reduce costs.
- **Asset Management:** Off-the-shelf solutions and specifically designed software have been deployed by almost all airlines for landside and airside asset management.
- **Flight Operations:** Real time integrated flight operation solutions are an intrinsic part of every airline and draw special attention for investment whenever required.
- **Inventory & Revenue Management:** Most full service carriers operating in India use sophisticated inventory and revenue management systems.
- **Distribution:** Due to considerable changes in distribution channels over the last few years, airlines have invested in IT solutions to streamline and strengthen their direct distribution

networks, primarily through online initiatives as well as call centres. However GDSs still remain an important channel.

- Aircraft Emissions: Due to regulatory requirements investments in solutions relating to aircraft emission checks and controls are being made.
- Data Analytics: Full service carriers are keen to use data mining and analytics tools to drive improved decision making, product differentiation and customisation and identify new opportunities. Airlines believe that this can provide them with a distinct competitive edge in the market.

#### ***Future Areas of Investment:***

- Mobile Technologies: Full service carriers showed interest in using mobiles technology for sales, check-in, boarding pass generation, but were not as keen as LCCs.
- RFID: As some kind of baggage handling, management and reconciliations system are already in place with all full service carriers, RFID will be invested in by airlines only if it proves to be cost efficient and delivers real value.
- Integration: Similar to airports, airlines are facing a huge challenge to integrate various standalone solutions for managing functions across the business. Integration with different airports having different platforms in place also needs to be addressed. Airlines are extremely keen to address this challenge.

#### **Low Fare Airlines**

##### ***Current Areas of Focus:***

- Self Service: For technology-driven low fare carriers, investment in any self-service functionality that drives down costs is a key area of investment on a continuous basis.
- E-Commerce: Low fare carriers with comparatively larger operations are experimenting with innovative on-board ecommerce solutions.
- Ancillary Revenue: IT driven cross selling of services – dynamic packaging for online sales - is a key component of investment and is considered integral towards generation of ancillary revenue. Investments provisions are always made to support and promote such value add services.
- Distribution: Low fare carriers have made significant investments in driving online distribution platforms. As it is considered the backbone of their business, airlines regularly invest to make the platforms more user friendly and visible.

- Operational Efficiency: Low fare carriers have been picking off the shelf solutions available in the market and customising them to their needs in order to keep costs low and to drive operational efficiency.
- Workforce Productivity: Investments have been made in arming the workforce with the latest and cost effective communication systems at various locations providing instant connectivity enabling quicker decision making and thus driving productivity.
- Business Intelligence: Revenue and yield management systems, ERP systems, passenger information databases and inventory management are being done using cutting edge IT support. Massive investments have been made and will be appropriately funded in future as well.
- Passenger Processing: CUTE has been adopted by almost all low cost carriers.

***Future Areas of Investment:***

- Mobile Technologies: Aggressive low fare carriers are extremely keen to implement mobile technologies which they see as the next area of major investments.
- Service Automation: Low fare carriers with significant scale of operations are planning to introduce automated self service passenger and baggage processing systems. Reducing customer interface at airports and driving down costs is the main operational challenge for these airlines. They are open to invest in anything that serves this purpose.
- Integration: Wherever possible, airlines are investing in available solutions and customisation for addressing the integration issues. However there is a huge gap which needs to be filled and airlines are very keen to invest in platforms that will solve the information flow challenge and help them coordinate across functional areas.

**Issues & Challenges**

- Lacking Inclusive Planning: LCCs are keen to look at technologies that can reduce costs and would like to be more closely involved in the planning process by airport operators for introducing new technologies.
- Integration & Data Management: As with full service carriers and airports the integration challenges for airlines remain the same.
- Cost & Scalability: Cost structure being the primary focus for low fare carriers it is a challenge to pick and customise solutions available in the market. Solutions can generally not be developed in-house due to lean organisational structures. Airlines would like IT vendors to come up with affordable solutions irrespective of the scale of their operations.

## Summary

Low fare carriers are more aggressive than full service airlines in using IT to drive their business. Their investments in IT are more strategic in nature and not seen as mere support functions as at full service or legacy carriers. LCCs have a greater level of readiness to adopt newer solutions that redefine the customer experience and cut costs.

## BORDER CONTROL

Border control of the import, export and transit of goods and people is critical to the integrity and sovereignty of India. The Bureau of Immigration, India (BoI) has been taking international cooperation on migration and border controls into sensitive areas of data collection and exchange. In response to the September 11, 2001 attacks, the organisation has accelerated border control information technology programs with the goal of facilitating passenger movement along with securing its borders. BoI has increased budgets, staffing and improved technology for border controls in order to track passenger and staff movements at the airport and facilitate the passengers' immigration clearance process.

According to BoI, the high priorities for investing in IT are to achieve the following objectives:

- Improve airport safety and security;
- Improve customer service and satisfaction;
- Comply with industry/regulatory standards.

Moreover, BoI has already started the process of integrating the airports with the Ministry of Home Affairs (MoHA), Ministry of External Affairs (MoEA) and Ministry of Defense (MoD) in order to provide a seamless flow of information across systems.

Solutions, such as advance pre screening of passengers and using PNRs for risk assessment have already been implemented. Automated border gates using biometric identification are a high priority initiative, to be followed by electronic documentation such as e-visas and e-passports. Biometric systems are expected to be rolled out in next 4 to 5 years.

However, a shortage of skilled IT people within the Bureau has been a key challenge. The organisation is placing a special focus on recruiting skilled IT professionals and is also training the workforce on requisite IT skills to gear up for the automation of systems related to border management. For IT vendors used by the BoI, domain expertise is critical.

## **CHAPTER 6: IT - A Critical Business Component for the Future**

### **Introduction**

Despite the challenges of the past year, the air transport industry (ATI) is still forecasting long-term growth. In fact, it now transports the equivalent of one-third of the world's population across the globe every year. And two of the fastest growing economies in the world—China and India—are on track to build 100 new airports in the next decade to meet growing demand.

With this growth will come a number of challenges and opportunities—from managing disruption to improving turnaround-times, reducing the industry's carbon footprint, exploiting the next wave of mobile-based technologies and continuing to improve profitability and operational performance.

IT can help meet these challenges, while at the same time developing new engagement models with customers, exploring new revenue channels and enhancing the passenger experience—making air travel easier, safer and hassle-free.

In many ways, IT has gone beyond its traditional role as a support function that delivers value, efficiency and innovation to the industry—to truly changing the way the ATI does business. For example, in the Indian aviation industry, technology is playing critical role in the proficient management of the modern airports and airlines. The surfacing of new technological solutions provides airport and airlines operators with opportunities to integrate the different elements of their operations to ensure more efficient and cost effective management. Technology provides the means to maximise revenue opportunities and reduce costs. Technology is the major drivers of change for both passenger management systems and it will delivers economic improvements to airport and airline operators.

### **Technology advances that will change air travel**

Innovation remains crucial in a competitive marketplace and investment in technology remains a logical consequence. Never more so than in the air transport industry.

There are five are new technologies that in the coming years will be making the journey simpler and smoother for travellers. By that time, three billion people could be using the global air transport system. Many of them will have spent their whole adult life in the digital age. They will expect information and personalisation whenever and wherever they travel. They will want to be always connected. Time will be a scarce resource.

The five technologies – mobile devices, Web 2.0, Near Field Communications, RFID and biometrics – will fulfil their needs and expectations. Some are already starting to make an impact. Others will require longer before they become a common feature of travel. But all of them have the potential to improve the passenger's experience of air travel from the earliest decision of choosing a flight through to transiting the airport and reaching landside at the final destination.

**Five of these advances will directly enhance the passenger experience. These include:**

**1. Mobile devices:** Mobile devices such as the iPhone and Google's G1 are quickly blurring the line between phones and computers, accelerating the acceptance that the mobile device is becoming the primary access point for online services.

Few people want to travel today without staying connected. Currently some 90% of airline passengers carry a mobile device with them when they travel. There is no doubt that this will have a significant impact on the ATI in several ways. To begin with, mobile ticketing, check-in and boarding passes will certainly become more common—if not the norm. This will reduce the need for IT infrastructure at airports, saving both airports and airlines money, while at the same time reducing airport congestion and improving the passenger experience.

Mobile devices, in combination with new inflight communications technology, may also someday replace onboard entertainment systems. Not only will this decrease airline operational costs—both in terms of technology investments and the extra fuel they burn to carry the current onboard systems—it also has the potential to enhance the the productivity and efficiency of their crew while they are in the air.

In addition, mobile devices will offer airlines and airports the opportunity to personalise their customer service. For example, they can reach passengers quickly and easily with updates on flight times, connecting flights and gate changes, as well as special promotional offers.

And finally, the combination of mobile devices and advanced communications technology will increase the productivity of both airline and airport staff in the airport environment hence enabling them to do their work more quickly and efficiently.

**2. Web 2.0:** Web 2.0 is quickly changing the face to the customer by making it faster, easier and more cost effective to provide real-time content from diverse sources, while at the same time meeting travellers' demands for greater information and personalisation. For example, some airlines are tweeting with their customers on Twitter, establishing Facebook pages and encouraging travellers to write posts on their blogs. Airports could easily follow suit. These new ways to interact with customers have potential to deepen customer relationships, improve customer retention and loyalty, and create opportunities for ancillary revenue.

**3. Near field communications (NFC):** NFC is a short-range, high-frequency wireless communications technology that enables the fast, simple exchange of data between devices over a 10-centimetre distance. This technology, which is quickly becoming a standard feature of contactless cards and mobile phones, may in the future function as paperless tickets for automated check-in and boarding, access cards for airline lounges and e-wallets to purchasing goods and services in airport shops or at vending machines.

NFC has the potential to contribute to more efficient passenger processing, improved passenger flow and secure access control. It may also enable new ticket sales channels and create new marketing opportunities. For example, NFC-enabled mobile phones could be used to buy plane tickets simply when held close to a terminal to purchase products and services. Similarly, an NFC-

enabled mobile device held close to a promotional poster or information kiosk could quickly download and store information about products, services and promotions. These same devices could be used to purchase food, beverages and other products and services in airport shops.

**4. Radio frequency identification (RFID):** RFID is an automatic identification method, which relies on storing and remotely retrieving data using devices called RFID tags or transponders. With many countries starting to issue RFID passports, this technology will start to have an impact on air travel.

By contributing to faster, more efficient and more secure passenger and baggage processing, RFID has the potential to improve passenger flow, result in less mishandled baggage, contribute to more secure air transport systems and reduce passenger-related delays. This provides benefits to both the ATI and its passengers.

**5. Biometrics:** Biometric recognition technology uniquely recognises humans based on one or more intrinsic physical or behavioural traits. According to SITA's Airport IT Trends Survey 2009, 24% of survey respondents said biometric technology was the trend that would have the most impact on their IT infrastructure over the next three years. Today, 18% of airports worldwide use biometric technology for some part of the passenger journey through the airport, and the use of this technology is expected to grow.

Not only will biometric technology help provide more secure air transport systems, it will also streamline processing, improve passenger flow and contribute to automated secure border management systems at airports.

**There are four additional technology advances that will improve ATI operations moving forward.**

They are high on the list of those that will deliver greater operational efficiencies. Most will be deeply embedded into the IT fabric of the industry, well hidden from the travelling public, but nevertheless playing an equally important part in the industry's competitive fight.

Open standards are an underlying theme for these technologies – Service Oriented Architecture (SOA), Collaborative Decision Making (CDM), cloud computing and virtualisation – and these standards need to be embraced by the industry if it is to fully realise the benefits. Some of the technologies are connected and will not be deployed in isolation. In particular, there are strong synergies to be had from cloud computing, virtualisation and SOA.

These include:

**1. Service Oriented Architecture (SOA):** Wikipedia defines SOA as separating functions into distinct units or services, which are made accessible over a network so they can be combined and reused to produce business applications. These services then communicate with each other by passing data from one service to another or by coordinating an activity between two or more services.

SITA's previous Airport IT Trend Survey indicates that more than 50% of airports will have implemented SOA architecture within 3-5 years, while airlines are also using it as a way to bridge the gap between legacy and digital technologies.

SOA will impact the ATI by facilitating faster application development and re-usable software modules. This technology, which has strong synergies with Software-as-a-Service, will also provide more flexible and standardised software architecture, while eliminating siloed processes and offering a common approach to business problems.

**2. Collaborative Decision Making (CDM):** CDM facilitates decision-making processes by ensuring that a combination of stakeholders—airlines, air traffic control, airports and ground-handling organisations—receive timely and accurate information. This includes accurate estimates of arrival and departure times, which can improve aircraft handling, apron services, gate management, ATC and Air Traffic Flow Management.

With CDM, the industry can improve predictability, make better decisions, optimise use of existing resources, enhance productivity, reduce operating costs and boost punctuality.

**3. Cloud computing:** Cloud computing is a process whereby elements of a company’s computer needs—software applications, processing power or data storage—are processed over the network as a service, rather than through an in-house IT system. This is not a new idea, but what is different now is that improvements in network infrastructure mean it will become increasingly feasible to run business critical applications remotely.

Cloud computing makes it easier for the ATI to deploy software to users, increases an organisation’s flexibility and scalability to meet peak demands in IT service, and reduces capital costs and pay-per-use only schemes. It also makes it easier to access applications and services while users are on the move.

**4. Virtualisation:** Virtualisation, which involves creating a virtual version of an operating system, server, storage device or network resource, will headline emerging trends over the coming years as technology providers start focusing on intelligent design of IT infrastructure and systems.

According to the 2009 Airport IT Trends Survey, 66% of respondents plan to invest in virtualisation in response to the current economic climate.

Virtualisation will benefit the ATI by reducing capital costs, providing greater optimisation of existing IT assets, lowering the industry’s environmental footprint by decreasing CO<sub>2</sub> emissions, and by providing simpler IT management with faster disaster recovery potential if needed.

What is common to all nine technologies? It is the way that they will change the traditional boundaries of an IT department by consigning legacy technologies to the museum. This represents a milestone for the industry, but also a great opportunity.

Digital technologies can be a means to revisit the way business is conducted and introduce substantially more efficient processes and workflows. The challenge for the industry is to find a cost-effective model that allows it to benefit from these innovations.

Underlying nearly all of these technology trends is the movement toward “green technology” in the ATI. With new regulations and growing public interest in climate change, the ATI is looking at new technologies, which will help it reduce its carbon footprint—by decreasing fuel burn, flying shorter, more direct flights, reducing CO<sub>2</sub> emissions and generally using assets more effectively and efficiently. Technology will be a key enabler in this change, while at the same time reducing costs, improving revenues and contributing to new innovations.

### **IT as a key enabler in the Indian air transport industry**

Even with the economic recession, the Indian aviation industry has been growing at an impressive rate since 2002 based on several factors including the entry of low cost carriers, higher household incomes, strong economic growth and surging tourism.

CAPA forecasts growth rates of 10-12% in international traffic and 15% or more in domestic traffic in 2010/11. This level of growth is expected to be sustained or even exceeded for the next few years.

At this rate, by the end of 2010, India will have projected traffic of over 35 million international passengers and 100 million domestic passengers. And with less than 2% of Indians currently travelling by air in any given year, the opportunity for future growth is tremendous.

However, rapid growth poses new challenges for India in terms of providing adequate infrastructure at airports and optimising the sector’s resources—from human resources to aircraft utilisation to revenue.

Technology is already finding solutions to some of these challenges. For example, several Indian airports are using CUTE (Common Use Terminal Equipment) check-in and boarding systems to facilitate passenger processing. They are also using baggage reconciliation systems and inline baggage screening systems to improve both the passenger and the airline experience at Indian airports.

Meanwhile, Indian airlines are using technology less as a support tool and more as a strategic business tool around which various business models may be built. In fact technology has greatly contributed to the emergence of the Low Cost Carrier business model in India, a model that may well dominate the domestic passenger travel in the near future.

Technology can also help overcome challenges in the area of administration, passenger and cargo handling, terminal services, air traffic management and security services—among others—helping India minimise costs, enhance quality of service, improve profitability and ensure that passengers travelling through Indian airports enjoy a safe and efficient experience.

### **Future technologies likely to impact the Indian aviation sector**

Among the key technologies that are expected to have a significant impact on the Indian aviation sector are passenger self-service (PSS) solutions, Radio Frequency Identification (RFID) technology, Common Use Terminal Equipment (CUTE), and Internet and mobile technologies.

1. **Passenger Self-Service:** Passenger self-service is playing an increasingly strategic role across the Indian aviation industry, as it quickly moves from an alternative passenger processing channel to a primary channel. Airline kiosks are now offering travellers a variety of self-service functions including ticketing, flight check-in and boarding pass printing—without the need for ground staff. These solutions reduce congestion, contribute to smoother passenger handling and make both airlines and airports more attractive to both customers and potential investors.

Common Terminal Use Equipment (CUTE), which is making inroads at Indian airports, enables all airlines to process passengers at all check-in counters, further increasing processing capacity and decreasing airport congestion—while at the same time reducing cost structures. In the future, Common Use Self Service (CUSS) systems will enable passengers to get their boarding passes from kiosks in locations such as shopping malls, hotels, and railway and bus stations, will also reduce pressure on airport check-in counters.

2. **RFID technology:** RFID technology is poised to offer substantial benefits to the ATI in India by reducing costs, improving productivity, and enhancing both customer service and safety. For example, RFID offers great potential improvements in processing bags at the airport by reading luggage tags more reliably than bar code readers and by integrating with the rest of the airport infrastructure. This will enable systems at any airport to immediately and automatically identify a mishandled bag, collect handling instructions from the airline responsible for the bag and route it to the correct destination.

Similar benefits are expected as RFID technology is applied to handling cargo and containers, as well as managing other assets used either at an airport or within an aircraft.

3. **Internet and mobile technologies:** Throughout India, Internet usage and mobile technologies are making travel more cost effective. For example, tickets sold directly through the Internet and mobile technologies are helping airlines reduce their operational costs by eliminating agency commissions on tickets. In the future, value-added inflight technologies, such as video-on-demand, mobile inflight telephony and inflight Internet access are expected to become key differentiators for the airlines, especially on long-haul flights.

While many Indian airports have already successfully deployed IT technology to help improve passenger and cargo processing, increase operational efficiency, enhance safety and ensure both regularity and security of operations, there are still opportunities for improvement and growth.

India is expected to witness tremendous growth of IT penetration in all customer-facing processes throughout the entire ATI lifecycle. SITA's partnership with the Airport Authority of India to implement AirportConnect Open, which enables airlines to access their own dedicated applications in a common-use environment at 12 non-metro airports in the country—provides just one example of this trend. This initiative will help modernise the airports, while opening the door to cost effective, more efficient CUSS systems and new Baggage Reconciliation Systems—all of which will help reduce costs, while providing a better passenger experience.

The Indian government is also keen to use IT to enhance border control by better tracking movements of people and goods and facilitating immigration. This will remain a key priority for the country as it considers the import, export, and transit of goods and people critical to its national integrity and sovereignty.

## **Conclusion**

New and emerging technologies in the ATI are poised to significantly change air travel as we know it today. Common to all emerging technologies is the way they will change the traditional boundaries of an IT department by moving beyond legacy systems and traditional support functions to become more of a strategic business tool. This represents both an industry milestone—and a great opportunity.

The Indian aviation industry is already using technology to automate and speed up processes, cut costs, improve operational efficiencies and creating distinct competitive advantages. In many cases, IT is helping not only provide solutions to infrastructure challenges and support issues in the Indian aviation industry, but also helping to shape the industry's future. For example, some airlines, i.e. Low Cost Carriers are using IT to develop completely new business models.

In the future, India's aviation industry is also expected to benefit and maximise from technologies such as:

- Passenger Self-Service, particularly Common Use Self Service Systems (CUSS), which will reduce pressure on airport check ins and reduce costs
- Radio Frequency Identification (RFID) technology, which will contribute to baggage and cargo tracking and management at India's airports, along with general asset management
- Internet and mobile technologies, which make travel more effective, while also providing new ways for airlines to differentiate themselves

No matter which technologies take the lead, one thing is certain: IT will become a critical business component for the future—both in India and around the world. Not only will it provide solutions to common industry challenges, it will also help the industry develop new engagement models with customers, explore new revenue channels and generally enhance the passenger experience—making air travel easier, safer and hassle-free.

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## About SITA

We are the world's leading specialists in air transport communications and IT solutions. We deliver and manage business solutions for airline, airport, GDS, government and other customers over the world's most extensive network, which forms the communications backbone of the global air transport industry.

Created and owned by the air transport community, SITA is the community's dedicated partner for information and communications technology. As a team of industry experts, our know-how is based on working with customers across the global air transport community. Almost every airline and airport in the world does business with SITA.

SITA innovates collaboratively with the air transport industry, and the industry itself drives the company's portfolio and strategic direction. Our portfolio includes managed global communications, infrastructure and outsourcing services, as well as services for airline commercial management, passenger operations, flight operations, aircraft operations, air-to-ground communications, airport management and operations, baggage operations, transportation security and border management, cargo operations and more.

With a customer service team of over 1,700 staff around the world, we invest significantly in achieving best-in-class customer service, providing integrated local and global support for both our communications and IT application services.

We have two main subsidiaries: OnAir, which is the leading provider of in-flight connectivity, and CHAMP Cargosystems, the world's only IT company dedicated solely to air cargo. We also operate two joint ventures providing services to the air transport community: Aviareto for aircraft asset management and CertiPath for secure electronic identity management.

In addition, we sponsor .aero, the Internet top level domain reserved exclusively for aviation. We are one of world's most international companies. Our global reach is based on local presence, with services for over 550 air transport industry members and 3,200 customers in over 200 countries and territories. In 2009, SITA celebrated 60 years in business.

Set up in 1949 with 11 member airlines, today we employ people of more than 140 nationalities, speaking over 70 different languages. SITA had consolidated revenues of over US\$1.47 billion (€1.13 billion) in 2008.

For more information on SITA visit [www.sita.aero](http://www.sita.aero)

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