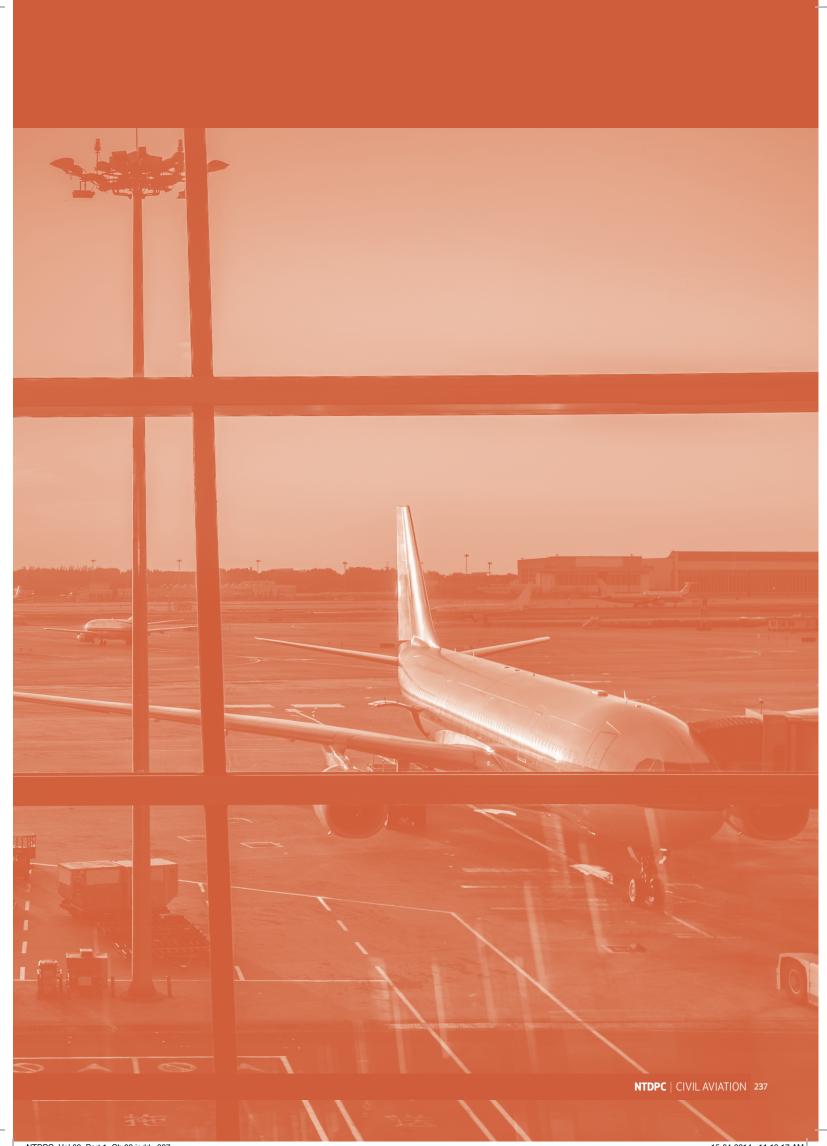
# 3. CIVIL AVIATION 236 NATIONAL TRANSPORT DEVELOPMENT POLICY COMMITTEE | 2013

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# **CIVIL AVIATION**

If the path outside one's home provides the basic means of accessibility to the outside world, then aviation services are, for the most part, at the other end of the connectivity spectrum: they allow faster travel to more locations than any other transport mode.

Via an aircraft, Indians of certain means access leisure, education and business opportunities across the country and around the world. Destinations that were only diversions for the daydreaming mind a generation ago are now within ready reach of millions of urban Indians. The aircraft continues to moderate the financial, physical and emotional transaction costs of studying at a foreign university, or of spending several years employed overseas. Inbound tourism, reliant almost entirely on civil aviation, has brought a great fillip to the travel industry, served as an important source of foreign exchange, and provided much needed impetus for the preservation of country's natural and cultural heritage.

Domestically, the idea of the 'day trip' has entered the vernacular: managers and officials routinely access nearly every part of India in under three hours for a meeting. Closer ties between hinterland factories and mines, and urban head offices allow for greater business efficiencies. Aviation makes possible the shipment of fresh flowers from the Himachal and fresh fish from Kerala to wherever they will command the highest price. It allows firms to rationalise production and storage costs by sourcing intermediate components as required. Aviation has come to form the cornerstone element of time-sensitive logistics services.

Even so, air travel is not simply a means for going further, faster. The aircraft opens up the world at a more fundamental level. It allows wider first-hand exposure to and dissemination of new ideas. Where forbidding terrain or sparse populations cause certain regions to be un-served or underserved by road and rail, the aircraft can prove to be the most financially judicious and perhaps environmentallyfriendly means of providing basic connectivity.

In short, by compressing the time between origin and destination, the aircraft is the basic engine of the modern globalised world. It has expanded the world by shrinking it. As India seeks to grow its economy at the desired rates over the next 20 years, the careful nurturing and expansion of the aviation sector will be of the utmost consequence.

In 2012, more than 2.9 billion passengers travelled by air worldwide, a figure that was 5 per cent higher than the previous year<sup>1</sup>.

At one end, passengers took flights that hopped across islands in no more than five minutes. At the other, they stayed aloft in giant airliners for the better part of a day before arriving at destinations on the other side of the world. They flew on lowcost carriers that offer ever more innovative revenue generation and pricing mechanisms, allowing more people to make their very first flights. They also flew on legacy fullservice carriers with the

Air travel is not simply a means for going further, faster. Where forbidding terrain or sparse populations cause certain regions to be unserved or underserved by road or rail, air travel can be the most financially judicious means of providing connectivity.

promise of the traditional courtesies and pleasures of a baggage allowance, a hot lunch, and a movie. Passengers were offered more choices of destinations on more airlines than ever before. Against this, they had to contend with crowded and inefficient airports, sub-optimal routings, increasingly stringent security arrangements, and airfares bloated with fuel surcharges and a laundry list of taxes.

Meanwhile, the 51 million tonnes of cargo transported by air in 2012 were a small decline on the volumes of previous years, a reflection of recent anaemic growth in the world economy. That said, facilities for processing airfreight have continued to be designed and implemented at rapid rates. Logistics firms and freight forwarders have built dedicated hubs at

1. ICAO (2012).

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major world airports to process cargo. Governments have lent a hand by installing dedicated customs and clearance facilities for both exports and imports, and by minimising the times required to remove cargo for onward transhipment. The net result of these movements of passengers and freight is an aviation

Over time, the aviation sector has continued to restructure and consolidate, with a number of mergers taking place. The aftershocks of the government's directive for Air India and Indian Airlines to merge are still being experienced.

business that directly supports over 8.4 million jobs and generates \$539 billion in worldwide GDP<sup>2</sup>.

In 2011-12, the Indian civil aviation sector provided the means for transporting 122 million domestic and 40 million international passengers as well as 807 million metric tonnes of domestic cargo<sup>3</sup> and 1,460 million metric tonnes of international cargo. Over the 11<sup>th</sup> Plan period, domestic passenger movements have grown at 11.5 per cent per

annum, and international passenger movements at 9.5 per cent. International freight traffic has grown at 7.5 per cent, somewhat slower than the domestic freight growth rates of 8.8 per cent. (All multi-year growth rates are compounded annual rates.) These strong growth rates have occurred during a period of relative weakness for the Indian economy, at least when compared with the previous Plan period. As the economy returns to growth rates of more than 7 per cent, as expected over the long term, the demand for passenger and freight aviation services will climb at rates in excess of those noted here. These growth rates mandate renewed emphasis on encouraging public and private investment in airport infrastructure, and in creating sensible policies that promote the growth of a competitive but stable aviation network.

### **INDIAN AVIATION: A SHORT HISTORY**

Less than eight years after the Wright brothers' 12-second airborne adventure in 1903 on a wood-and-cloth contrivance at Kitty Hawk in the United States (US), the first aircraft was flying over Indian airspace<sup>4</sup>. Many of these early airplanes were recreational, the preserve of interested, wealthy and often ingenious amateurs. Mail services and ad hoc passenger air services quickly followed. By 1932, the serially enterprising firm of Tata Sons had set up an airline to deliver mail under a government contract. The government would eventually become an equity

partner in the airline in 1946, with a rebranding to Air India the same year. Air India's first international service, from Mumbai to London, followed in 1948. At the time, nine operational airlines provided a simple patchwork of scheduled and charter air services.

With the passing of the 1953 Air Corporation Act, the assets of each of these were subsumed into the creation of two new state-owned enterprises: Air India International and the Indian Airlines Corporation. The Act, which prohibited any party other than these two corporations from operating scheduled air transport services to, from or within India, effectively gave monopoly rights to Air India and Indian Airlines. Monopoly outcomes being what they are, air services remained undersupplied and overpriced for much of the post-Independence period. Apart from the US, many countries followed the state-owned flag-carrier model for their airlines, for security and diplomatic reasons as much as any others. This eventually led to the complex system of bilateral landing rights negotiations that persists to this day.

For the next several decades, the history of Indian aviation is synonymous with that of Air India and Indian Airlines. Between the two, Air India fared substantially the better, cautiously expanding its route network to South-East Asia, the Middle East and Africa, Europe and the US. An aggressive programme of fleet modernisation resulted in it being one of the first airlines to enter the jet age. New equipment combined with a distinctly Indian emphasis on warm hospitality delivered a stellar reputation for Air India.

Meanwhile, Indian Airlines, being the slightly uncomfortable melange of eight parent post-Independence airlines, never quite bedded operations down into an efficient and profitable domestic network. It was hindered in this task by a government mandate that required it to provide service to unprofitable destinations, poor airport infrastructure outside the major metropolitan centres, an unfortunate selection of aircraft in the fleet that were variously susceptible to malfunctions or unsuited to the demands of the network, and complications arising from various regional security skirmishes.

The Indian airlines did not prove immune to the oil shocks of the 1970s. Elsewhere, the massive losses sustained by the sector paved the way for deregulation and private competition from the late 1970s onwards. In India, the airlines were rescued through a series of capital injections and soft loans intended to stave off bankruptcy. Problems were compounded by several waves of labour unrest and strike action.

<sup>2.</sup> ATAG (2012). The same study calculates the total impact of aviation, including indirect and catalytic effects, at \$1.4tn with the support of 22m jobs.

<sup>3.</sup> AAI Traffic News, March 2012

<sup>4.</sup> The Ministry of Civil Aviation commemorated the centenary of aviation in India on 18 February 2011. A hundred years earlier, Henri Piquet had purportedly carried 6,500 pieces of mail 13 km from Ahmedabad to Naini on a Humber biplane.

In 1986, the government began to allow private airlines to operate charter and non-scheduled services under the Air Taxi Scheme, according to which private carriers could transport passengers but were not permitted to publish time schedules or issue physical tickets to passengers. Nonetheless, the introduction of the Air Taxi Scheme was intended to enhance domestic air services, thereby providing a boost to (largely domestic) tourism and a small measure of competition within the existing monopoly market. The result was that a number of private players—many of which would ultimately become full private airlines—began operations as air taxi operators. Among these were Air Sahara, Jet Airways, Modiluft and East-West Airlines.

In March 1994, the Government of India repealed the Air Corporation Act and opened the air transport sector to private players, subject to the fulfilment of certain statutory requirements. And in 1997, additional measures were taken to further remove barriers to entry and exit in the domestic aviation sector, as the government relaxed requirements placed upon prospective entrants and began to leave more decision making authority (e.g., choice of aircrafts and fleet size) to individual operators. By 1997, four airlines that had begun taxi operations following the 1986 deregulation were in business as full-service scheduled carriers.

The entry of low-cost carriers into the market marked a watershed moment that dramatically altered India's aviation sector. In 2003, Air Deccan, India's first low-cost carrier, entered the domestic market, creating a new form of competition within what was, at the time, a highly-concentrated industry comprised mainly of Indian Airlines, Air Sahara and Jet Airways.

Following that initial shake-up of the competitive landscape, other carriers appeared. In 2005, Kingfisher launched its business together with three lowcost carriers in Go Air, Paramount and SpiceJet. The following year, IndiGo entered the market, going on to become the largest domestic airline in India. In short, these changes have significantly altered the market structure and made air travel gradually more affordable. This phenomenon, coupled with India's growing middle class and economic successes in the decade to 2011, led to significant passenger traffic growth. Moreover, market changes have brought with them other customer-friendly developments, including the Advance Purchase Fare pricing strategy, which has resulted in discounted fares, promotional offers and the steady introduction of flights to new domestic and international destinations. The co-existence of full-service and low-cost carriers has provided greater choice and made air travel more affordable to a broader section of India's population. Under the Air Cargo Open Sky Policy, airlines, foreign and domestic, were allowed to operate cargo services to or from any Indian airport with customs facilities. The existing regulatory regime over cargo rates for major export commodities was also abolished.

Over time, the sector has continued to restructure and consolidate, with a number of mergers taking place. The aftershocks of the government's directive for Air India and Indian Airlines to merge are still being experienced, with the combined entity lurching from one precarious debt position to another. Meanwhile, the full-service airline Kingfisher's illconsidered merger with the low-cost Air Deccan seems only to have resulted in an airline uncertain of its position and strategy, and for which it appears to have paid the ultimate price. For a while, the most successful of the mergers was that of Jet Airways with Air Sahara. By mid 2012, however, the new Jet Airways also found itself struggling to compete in a difficult market.

In the 1980s, the Indian economy grew at over 5 per cent annually but suffered from continual shortages of international air cargo capacity, which quickly became a key obstacle hindering the industry's ability to enhance export and foreign currency exchange earnings. Following the announcement of the government's industry-wise 'economic disengagement' policy in 1990, the Air Cargo Open Sky Policy was adopted initially for three years and thereafter permanently. Under this policy, any airline, foreign or domestic, that met certain operational and safety requirements, was allowed to operate scheduled and unscheduled cargo services to or from any Indian airport with customs facilities. Additionally, the Air Cargo Open Sky Policy abolished the existing regulatory regime over cargo rates for major export commodities, enabling carriers to begin setting their own rates. The government also relaxed restrictions on foreign airlines operating mixed passenger and freight aircraft, allowing additional passenger flights into India, and further liberalised domestic air taxi operations and the rules on international tourist charters. To make these changes, the government did not require reciprocity from bilateral partners for Indian carriers.

In the 1990s, when sector deregulation permitted private carriers to begin flying domestic routesinitially as air taxis and thereafter, as scheduled airlines—the government initially permitted up to 40 per cent foreign direct investment in scheduled air carriers, including by foreign airlines. For example, Gulf Air and Kuwait Airways held a 20 per cent stake each in Jet Airways, providing the young airline with much-needed access to both managerial

Figure 3.1 IATA Index of Air Connectivity (2005)

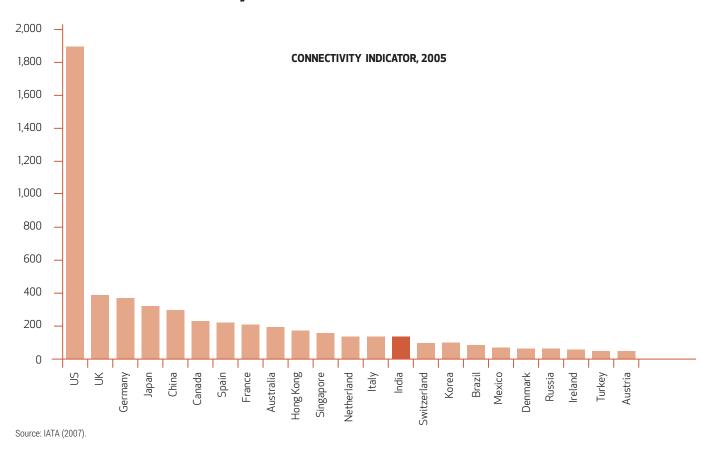
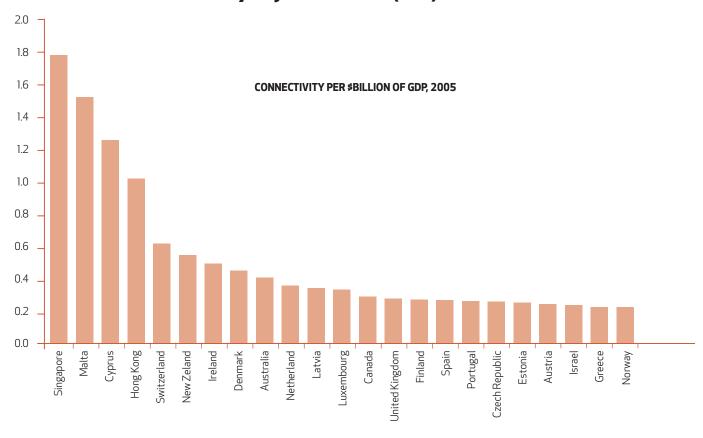
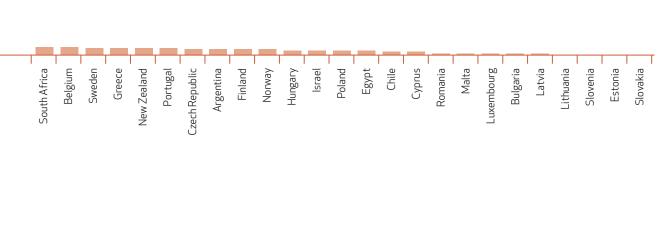


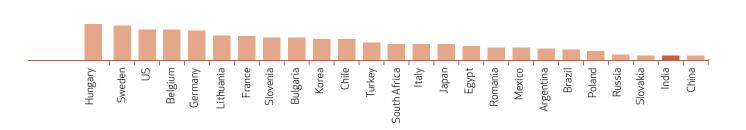
Figure 3. 2 IATA Index of Air Connectivity, Adjusted for GDP (PPP), (2005)



Source: IATA (2007).

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It is fair to claim that the deregulation, liberalisation and eventual democratisation of civil aviation have made a seat on an aircraft accessible to more global citizens, and latterly to Indians, than ever before.

and technical expertise as well as international passenger feed.

However, these benefits were short-lived: in 1996, the Government of India announced that foreign airline shareholdings were not in the best interest of Indian carriers and would thus no longer be permitted. At the time, the government's stated primary concern was that local private carriers were still very small and thus, there was a significant risk that foreign airlines would control these domestic carriers' development so as to feed their own offshore hubs, thereby relegating Indian airlines to the status of regional carriers and thwarting healthy development of the domestic civil aviation sector. Jet Airways thus had to buy back its shares from Gulf Air and Kuwait Airways, and the government reasoned that foreign airline investment restrictions would ultimately be lifted when domestic carriers were robust enough to negotiate as equals with potential investors. But over time, a combination of factors—poor economic conditions, looming security concerns and the ever-present question of how relaxed foreign airline investment restrictions would affect Air India—kept the restriction intact, until it was finally lifted in September 2012. A detailed analysis of this recent regulatory revision follows in a later section.

### INDIA'S AIR CONNECTEDNESS

Around the world, air travel was the preserve of the wealthy and an elite few only a generation or two ago. Until the dawn of jet age, any necessary intercontinental journeys were made by ship or not at all. Ocean-going liners did not give up their domination of transatlantic passenger traffic to airlines until the early 1960s. And passengers who chose to board an aircraft, paid handsomely for the privilege of dramatically shorter transit times. Various estimates suggest that real airfares have declined by well over two-thirds since the first waves of deregulation of the airlines in the 1970s. For example, in 2012 dollars, the heavily trafficked and competitive New York-London route was around \$3,200 in 1970 and \$800 in 2012<sup>5</sup>. Leaving aside any hedonic adjustments for the

changing quality of service over the ages (in either direction), the relative affordability of modern-day air travel is made starker by considering airfares as shares of income: the same New York-London airfare was 14 per cent of US per capita GDP in 1970. By 2012, this had declined to less than 2 per cent. A similar story can be told in the Indian context. Civil aviation was very much considered a 'luxury for the few' (and taxed as such) with rail being the de facto choice for domestic long-distance passenger travel.

It is fair to claim that the deregulation, liberalisation and eventual democratisation of civil aviation have made a seat on an aircraft accessible to more global citizens, and latterly to Indians, than ever before. The impact of civil aviation on general economic activity is well-documented. An expansive and efficient aviation sector contributes significantly to a nation's economic development, generating both direct and indirect employment opportunities and simultaneously facilitating better productivity and efficiency in the manufacture and movement of goods and services. Since many of these benefits derive from the connectivity of an economy with its trading partners, it is useful to begin an examination of the economic impacts with an assessment of the present state of connectedness.

Aviation has improved India's internal and external connectivity by providing cheaper, more frequent, more reliable, and otherwise better transport service between many cities. According to the International Air Transport Association (IATA), the slightly nebulous concept of aviation connectivity is defined as a measure of both the number and the economic importance of the destinations served from a country's airports, the frequency of the service to each destination, and the number of onward connections available from each destination<sup>6</sup>. As such, this indicator is qualitative, measuring the relative importance of the destinations served rather than being purely monotonic with the number of destinations served, and the frequency of service7. Though the index is somewhat dated, the important point drawn from a comparison of Figure 3.1 with Figure 3.2 is that though India may be seemingly well-connected in terms of the number and importance of destinations served (a fact that will have only gained further credence in the ensuing years), connectivity is still relatively low when this is adjusted for the size of the Indian economy<sup>8</sup>.

Arvis and Shepherd deployed a technique derived from gravity models of trade to create an Air Connectivity Index for the World Bank<sup>9</sup>. These models

5. IATA (2007, p. 16)

<sup>5.</sup> NTDPC calculation based on official CPI series and historical data from OAG.

<sup>7.</sup> The relative importance of a destination is defined in terms of the economic influence it exerts on the rest of the world, i.e., in terms of its GDP.

<sup>8.</sup> A 2009 update of the index (with a UK-centric focus) shows that India's air connectivity relative to GDP on a PPP basis improved between 2005 and 2009, with a higher rank than Venezuela, Poland and Russia. Over the same period, China improved its ranking from the bottom-of-the-table to nearly mid-table, with a ranking superior to that Brazil, South Korea, France and Turkey.

<sup>9.</sup> Arvis and Shepherd (2011)

Table 3.1 **International Air Connectivity Index, Calculated for 201 Countries** 

RANK	COUNTRY	INDEX
1	United States	22.7
2	Canada	13.4
3	Germany	12.1
7	France	11.6
8	United Kingdom	11.6
44	Australia	5.9
46	China	5.7
88	India	3.8
125	Brazil	2.7

Source: Arvis and Shepherd (2011).

directly address the networked nature of the air transport industry. They defined a country's connectivity to be synonymous with its importance as a node within the global air network, thereby better capturing the hub-and-spoke nature of modern air networks. As they write, 'when a country is considered to be better connected, the stronger is the overall "pull" it exerts on the rest of the network. A country's connectivity score is higher if the cost of moving to other countries in the network is relatively low. It is considered to be less well-connected if the dispersion of these costs is high'10. In short, the greater the number of direct links that a country will have to other countries, and the higher the frequency of those links, the better the country's connectivity score. Their approach also uses realistic cost functions that accurately model the cost, technology and policy environments that airline managers face in planning route networks. The limitation is that the index only measures international connectivity. Arvis and Shepherd calculated the Air Connectivity Index for 201 countries in 2011; Table 3.1 presents results for a select sample.

The comparisons of the top two ranked countries offer an illustrative example in understanding air connectivity. The US, with roughly 10 times the population of Canada, has proportionately more international traffic. However, the assessment of Canada's connectivity is boosted by the fact that most cities have extremely strong air links with several major US hub airports, from where these cities can access the world. In similar fashion, India's connectivity is boosted by the high frequency of its links with the largest international hub airports (such as Singapore, Hong Kong, London, and the Gulf airports of Dubai, Doha and Abu Dhabi), which then provide it with one-stop access to a substantial majority of the world's important cities.

To sum up, India's connections with the world rely primarily on the strength of excellent links with regional hubs-and therefore, exhibit a marked dependence on overseas infrastructure and service providers. Connectivity is low by international standards, relative to the PPP-adjusted size of the economy. Finally, there has been little formal analysis on the changes in internal connectivity that have been achieved over the years.

### THE ECONOMIC IMPACT OF AVIATION

The overall effects of this connectivity can be measured in terms of the easier access provided to more markets, efficiency improvements, and greater domestic and international competitiveness (see Figure 3.4). By connecting businesses with a wider

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<sup>10.</sup> Ibid. (p. 3). These results mean that a spoke country with a strong connection to another country cannot be considered to be well-connected. A regional hub with strong connections to a moderate number of destinations receives an intermediate connectivity score, since the costs are relatively dispersed across the remainder of a network. Finally, a global hub with strong connections to many countries in the network receives a relatively high score.

Figure 3. 3

Travel Markets at Different Stages of Development

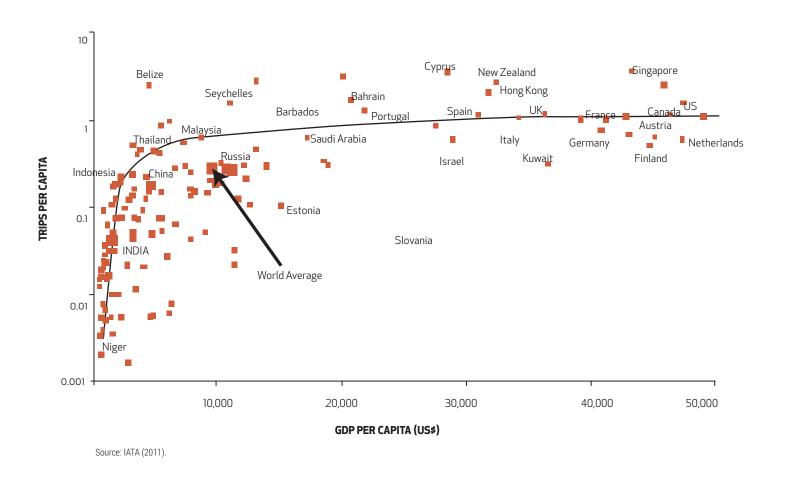
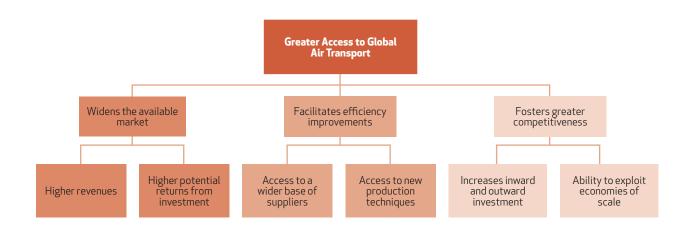


Figure 3. 4 **The Wider Economic Impact of Connectivity** 



Source: IATA (2009).

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range of global markets, and expanding the customer base, air transport allows for higher revenues and higher returns from capital deployed. These benefits are particularly relevant for sectors that manufacture products with high values-to-weight, and for those shipping time-sensitive goods. By expanding the customer base, air transport allows companies to exploit economies of scale and to reduce unit costs. By exposing domestic companies to increased foreign competition, it also helps to drive efficiency improvements among domestic firms in order to remain competitive.

Several industries rely on air transport to operate their just-in-time production operations, providing greater flexibility within their supply chains. Costs are controlled from a reduced need to hold stocks of supplies. Extensive air transport links facilitate effective networking and collaboration within and between firms located in India and abroad. Access to a greater number of markets also encourages greater spending on research and development by companies, given the increased size of the potential market for future sales.

'Improved connectivity gives Indian businesses greater access to foreign markets, encouraging exports, and also increases competition and choice in the home market from foreign producers. It encourages firms to specialise in areas where they possess a comparative advantage. Where firms enjoy a comparative advantage, international trade provides the opportunity to better exploit economies of scale, driving down their costs and prices, benefiting domestic consumers in the process. Opening domestic markets to foreign competitors can also help reduce unit production costs, either by forcing domestic firms to adopt best international practices in production and management methods or by encouraging innovation. Competition can also benefit domestic customers by reducing the mark-up over cost that firms charge their customers, especially where domestic firms have hitherto enjoyed some shelter from competition'11.

### PRODUCTIVITY IN THE AVIATION SECTOR AND **GENERAL IMPACT**

Relative to other spheres of economic activity, the sector exhibits relatively high levels of labour and multi-factor productivity. The productivity increases have come from the use of better technology in the form of more efficient airframes and engines, better regulatory policy that allows more airlines to use more innovative pricing regimes, better operating practice that results in faster turnaround times at airports, and so forth. In short, as in other industries, all productivity improvements can be traced to changes in technology, worker skills, institutional factors, capital utilisation and economies of scale.

Moreover, the international and relatively fungible nature of the business, personnel, and equipmentcompare planes with trains and automobiles—means that productivity gains quickly filter across national boundaries. For example, better engine technologies developed offshore are quickly made available for export. (The same handful of manufacturing companies provide the aircraft deployed throughout the world.) Best practice standards or regulations set for one jurisdiction are necessarily or voluntarily adopted by the entire industry and by other jurisdictions. Safety protocols set by the Federal Aviation Administration of the United States or environmental restrictions placed by European authorities may indeed only apply to aircraft and airlines flying into and out of these regions. However, their influ-

ence, which derives from the size of their markets, means that these protocols quickly become de facto global standards. Meanwhile, improvements in the competitiveness of foreign airlines force local carriers to improve their practices, at least in the markets that they compete directly with these

Improvements in aviation productivity have raised productivity in almost every sector of the economy, from manufacturing to retail, tourism to agriculture.

foreign airlines. These improvements then naturally filter into domestic markets. In summary, the aviation sector is productive, and is also a sector where several types of productivity differentials cannot be expected to persist for long. (Of course, the efficient migration of productivity improvements across borders also depends on a prevailing regulatory environment that must be receptive to these improvements.)

The improvements in aviation productivity have also served to improve productivity in almost every other sector of the economy, from manufacturing to retail, from tourism to agriculture. This improvement in productivity in firms outside the aviation sector comes through two main channels: through the effects on domestic firms of increased access to foreign markets, and increased foreign competition in the home market, and through the freer movement of investment capital and workers between countries.

This last point is an important, though less visible, avenue by which aviation and the industry's productivity influences economic productivity more generally, through the marginal productivity of capital. Access to extensive air transport links allows domestic firms to identify and manage investments in foreign assets and encourages foreign firms to invest in the domestic economy. Firms can make better investment decisions in offshore locales by undertaking first-hand due diligence and by monitoring their investments in physical plant and equipment more

11. Oxford Fconomics (2011, p. 10)

easily. In essence, the liberalisation of aviation enables the full flowering of the benefits of financial liberalisation. Capital can be more easily directed to its best use. For India, this will prove ever more important in the decades to come as it seeks to attract

More than a whiff of precariousness prevails in the sector, with most airline balance sheets failing to register profits over multi-year periods.

increasing amounts of foreign capital and as more Indian companies attempt to expand their operations overseas.

### **OVERALL EFFECTS**

Improved air transport has contributed to rapid growth in India's international trade in recent dec-

ades by offering a faster and more reliable method by which to transport products and personnel across long distances. In particular, high-growth sectors are heavily dependent on aviation, and it is essential that India's aviation industry continue to expand if the economy hopes to reap the full benefits of future foreign trade and investment expansion.

Air transport has contributed to rapid growth in international trade, offering rapid and reliable transportation to move products and individuals across long distances. Civil aviation has also played a vital role in tourism: in 2012, approximately 90 per cent of the 6.6 million foreign visitors to India arrived via air<sup>12</sup>. According to Oxford Economics in a study for the IATA, in 2009 the aviation sector directly contributed approximately 0.5 per cent to India's GDP and 1.5 per cent if the indirect effects are included<sup>13</sup>. The direct impact stems from the output of the aviation sector itself—airlines, airports, ground services and fees accruing to the government for the management of India's airspace. The indirect contributions to GDP arise from the aviation sector's supply chain and from the spending of those employed directly and indirectly by the industry14. The same study also reckons that in excess of 1.7 million high-productivity jobs are supported by the aviation sector, with 276,000 directly engaged in the provision of aviation services.

In the last 20 years, India's air cargo traffic has witnessed an average annual growth of 8.6 per cent. The entry of leading private air cargo companies into the Indian market has brought with it a wave of increased automation, mechanisation and process improvement initiatives at major air cargo terminals. That said, there is still a great deal of work to be done. The average weight load factor of air cargo over the previous five years was approximately 62 per cent, reflecting significant unused capacity. Generally speaking, air cargo has not been able to grow at the same pace as other cargo transport modes (notably marine cargo). The five-year CAGR for air cargo (approximately 11 per cent) is lower than the growth rate of India's overall exports and imports, which grew by approximately 15 per cent and 18 per cent respectively over the same period<sup>15</sup>.

Similarly, India's current proportion of air cargo (relative to cargo overall) is low versus other developing nations, and total air cargo volume for all Indian airports still pales in comparison to a number of individual airports, both within the region and globally (e.g., Hong Kong, Incheon, Shanghai, Paris and Anchorage). That these individual airports handle more cargo annually than all Indian airports in aggregate reflects tremendous growth potential for India's air cargo sector, particularly in light of strong projected economic growth and rising exports.

### THE MAJOR ISSUES

The past 20 years have brought dramatic changes to Indian aviation. More passengers are flying more often than ever before. New airlines are inaugurating new routes, both domestically and internationally. Prices have declined in both nominal and real terms generally, and a wide range of products is available at all service classes. Competition is rife, possibly even excessively so. Service frequency on the most popular metropolitan routes is in excess of 30 flights per day. Airports are being modernised and expanded with funding from both public and private sources. Safety standards at Indian airports and airlines are broadly at par with prevailing international practice.

Against this, the sector remains beset with problems and more than a whiff of precariousness prevails. Airline balance sheets and income statements are rickety, with most failing to register profits over multi-year periods. At various times, airfares have been considered to be unsustainably low or unjustifiably high, though the appropriate regulatory response is unclear. Passed under industry duress, new policies have reversed the long-standing injunction against foreign equity in domestic airlines. The cyclical wringing of hands over government subsidies to Air India, and the consequent effects on the industry, often results in little more than a fresh capital injection. Some issues have arisen regarding perceived high charges in some of the new private airports Amidst all this, the industry is hamstrung by a tortuous system of taxes, cesses, rules and regulatory

NTDPC~Vol 03 Part 1~Ch 03.indd 248

Ministry of Tourism (2012)

Oxford Economics (2011, p. 4)

The aviation sector's supply chain can be decomposed into the fuel, catering, repair and maintenance, ticketing and distribution, freight forwarding and aircraft financing activities sought by domestic airlines; into mineral products and composite hardware, and financial, technical and technological services sought by aerospace firms; and into the general requirements for finance and facilities management sought by firms that provide ground-based infrastructure.

15. NTDPC (2012, p. 53).

restrictions that are at odds with a sector that must necessarily be nimble and dynamic. This subsection provides summary snapshots of the most pressing issues confronting the aviation sector.

### **AVIATION AS PART OF A MULTI-MODAL** TRANSPORT NETWORK

A fundamental recommendation of this report is that every decision on transport infrastructure should, ultimately, be able to be traced back to a sense of place and purpose within the wider transport network that is inclusive of all modes. Elsewhere, the report has argued for network-centric thinking in planning transport infrastructure. Relative to road, rail and other land-based transport modes, aviation is unique in that the network comprises only nodes the airports. The arcs or paths between these nodes are typically just the shortest point-to-point distances subject to operational limitations.

Two major considerations apply towards ensuring aviation's place in the wider transport system. First, as with other modes, the efficiency of aviation and its contribution to social and economic welfare will be influenced by any policy that changes its cost or revenue structures. Second, at a more practical level, airports will function best as terminals if good land transport networks are available to quickly distribute passenger and cargo traffic to and from the region served by the airport. Depending on the size of the airport and the economic and demographic characteristics of the passenger traffic, these transport links may also include mass rapid transit options. The great advantages of air travel in terms of the savings in time that it offers will be muted if the air network does not cohere well with land-based transport. This is especially true for time-sensitive

### CAPACITY ENHANCEMENT

As with other modes, the capacity of the air transport network depends on each of the component elements: the capacity of airport terminals to process arriving and departing passengers, and to provide gates for aircraft; the ability of airlines to deploy more or larger aircraft at higher frequencies; and the efficiency of support provided by other transport networks, importantly roads. In turn these are dependent on more fundamental factors, including the productivity of the capital invested and of human resources, and on new technologies such as radar or navigation systems that permit aircraft to fly with narrower separations or in difficult weather conditions.

At present, a major limiting factor is the capacity of airports. Several of India's existing airports are already running at levels near full utilisation. There is a shortage of landing gates and areas for processing passengers are crowded. The crowding extends In spite of rapid growth, airport capacities remain constrained. The financial viability of the entire airline sector is in question. Adequate numbers of trained staff cannot be introduced to the sector. The economic regulation of airports has conspired to leave both airlines and airports dissatisfied with airport charges despite record traffic.

to the immediate airspace at peak times as aircraft circle awaiting a landing spot. Even some of the airports that have been recently expanded are projected to run into capacity issues within the next five years, necessitating further enlargement of terminal buildings or new secondary airports.

### **INSTITUTIONAL ARRANGEMENTS**

The Ministry of Civil Aviation is the central authority for the regulation of aviation in India. The oversight of Air India is also ultimately the ministry's responsibility. Under the ministry, the Directorate General of Civil Aviation manages the day-to-day tasks of ensuring that airline operators deliver safe and reliable service. It is responsible for making, implementing and monitoring compliance with the rules of civil aviation, and for the certification of pilots, engineers and other staff. The Airports Authority of India (AAI) constructs, maintains and operates the bulk of India's airports. More recently, it is a minority partner in six airports that have been modernised and are now operated as joint venture partnerships with private companies. A separate Airports Economic Regulatory Authority (AERA) is responsible for regulating airport charges.

With many of the decisions being made at the central level, and with the bulk of funding for new infrastructure arriving from the central fund, aviation should present fewer complications relating to the institutional arrangements that govern the sector. However, problems are present on several fronts. Airport capacities remain constrained, as noted above. The financial viability of the entire airline sector is in question. Adequate numbers of trained staff cannot be introduced to the sector. The economic regulation of airports has conspired to leave both airlines and airports dissatisfied with airport charges despite record traffic.

Reforms required for the future should emphasise the streamlining of decisions taken by these authorities aided by clarifications as to their agenda, remit and powers. The institutions will need to be strengthened with the addition of substantial numbers of staff skilled in network economics and regulation, certification, safety, setting and implementing standards, finance, and law. Greater cooperation between the

The 'airport-as-hub' debate must carefully piece through the costs and benefits of developing global hubs versus focusing on developing the domestic market, or on developing regional and national hubs.

authorities, civic agencies, and the administrators of other transport modes should also be mandated.

### **MANAGING COMPETITIVENESS**

In recent years, there have been severe doubts about the viability of many of India's operating airlines. Kingfisher has ceased operations, Air India has required equity injections from the government, and many of the others have failed to establish stable long-term financial outlooks. A number of causes can be attributed to this: the ultra-competitive environment that has forced fares lower and delivered compressed operating margins, the pricing of aviation turbine fuel, the lack of availability of skilled staff which has driven up salary bills, inflexible cost structures with respect to maintenance, a high and growing overhang of debt that was used to fuel recent growth, rupee depreciation, and challenging global and domestic economic conditions.

In this environment, regulatory agencies must walk a fine line between continuing to encourage industrial competitiveness to maximise consumer surpluses and ensuring that the competitiveness is not achieved at the price of unsustainable or irresponsible actions on the part of the airlines. It is important to ensure that the barriers to entry are not insurmountable for firms that clearly qualify on account of their financial standing or industry experience and expertise. It is equally important to manage the exit of airlines from the market with grace and efficiency so as to not impose negative externalities of these exits on the remaining airlines.

## DEVELOPMENT OF INDIAN AIRPORTS AS NATIONAL, REGIONAL AND GLOBAL HUBS

The hub-and-spoke model is an established result from efforts at optimising airline networks. (That said, it is certainly not optimal under all circumstances.) Discounting speed and any technological restrictions, the fundamental advantage that air travel holds over other modes of transport is the capacity to connect any two points on a map directly. However, traffic between these two points may not be sufficient to warrant scheduling a flight between them. If, however, passengers originating from several other airports can be assembled at a third point, then enough concentrated traffic may evolve to justify air service between this third point (the hub), and the first two. By collecting traffic, hubs afford viable air service to more locations than if every route was strictly between origin and destination.

It is obvious that metropolitan cities serve as natural hubs. Their large populations and concentrations of economic activity serve to attract people and cargo shipments. In India, Delhi and Mumbai serve as national hubs, accepting passengers and freight from abroad and other parts of India, and then forwarding these elsewhere within the country. Regional aviation—that is, travel between two non-metro cities—has yet to fully blossom in India on account of insufficient demand, though this may shortly change on some sectors. Consequently, there are few regional hubs, though Kolkata may be reasonably considered as the gateway to the North East region.

The astonishing growth of the airlines and airports of the Middle East in recent years has been predicated on their favourable geographic location, with hundreds of destinations within reach of their home airports by modern aircraft. A major plan mooted to provide further impetus to Indian aviation is the promotion of an Indian airport as just such a global hub. The hub will serve to concentrate passengers from countries West of India, distributing them onto flights headed East and vice versa. This is considered especially enticing at a time that the balance of air traffic is expected to swing decidedly East, towards Asia.

However, there are fundamental differences between India and the entrepot airports of the Middle East and South East Asia that weaken the case for an Indian airport as a global hub. Chief amongst these is the massive latent home market for both domestic and international travel which stakes deserved claim to be the premier development priority. Hubs also require a dominant airline with an extensive international network; these airlines often require implicit or explicit state support. The debate must therefore carefully piece through the costs and benefits of developing global hubs versus focusing on developing the domestic market, or on developing regional and national hubs.

### **FUNDING**

There are three issues on the funding of Indian airlines that immediately present themselves. With respect to Air India, it is necessary to frame a decisive policy of ownership on the government's part, and then setting a clear agenda for the airline. As with other State-owned enterprises, this agenda must not distort the market for privately owned competitors. Meanwhile, for these airlines, new rules on foreign ownership and operation of domestic airlines must be implemented. It must also develop careful regulations for assessing the stability of private equity and debt funding of domestic airlines, with a view towards promoting the overall financial health of the sector. Recent policy changes have made substantial headway in this regard (see section on foreign investment in Indian airlines).

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Though most Indian airports remain under the government's direct funding and administrative purview through the AAI, a handful of the very largest airports-Mumbai, Delhi, Hyderabad, Bengaluru, Cochin and Nagpur—are now joint-venture enterprises with private sector partners. For the AAIcontrolled airports, the challenge remains to operate airports in the public economic and social interest, but with due regard for commercial principles in general, and at a minimum, to be self-sustaining. To this end, each airport should be endowed with a set of operations goals and a development plan, have measurable targets by which performance can be gauged, and be encouraged to adopt transparent reporting processes. For joint-venture airports, the task before regulators and administrators is to devise proposals that attract participants with both financial resources and technical and expertise such that stable long-term ventures can be successfully negotiated.

### **PRICING**

The newly competitive landscape of Indian civil aviation has resulted in periodic bouts of cuthroat pricing of airfares. This competition is to be welcomed from a consumer's perspective. Regulators, however, have found cause to pause in the suggestion that the pricing is unsustainable, and the losses sustained will drive some participants out of the market, leading to higher airfares in the long run. At other times, there is considerable evidence of pricing that is unjustifiably high at times of increased passenger demand, such as during the festival season. As in many oligopolistic situations, the regulatory burden is in encouraging competition, permitting sensible and efficient market entry and exit, while building up a sector that is robust to short-term shocks. As discussed in a later section, the regulatory rules on the pricing of airfares require substantial overhaul.

Meanwhile, there is scope for authorities to ensure that airport pricing regimes for landing charges, passenger services, cargo, parking and hangar space, and other items like security and noise-related charges, are fairly determined and transparently applied. At all airports, possibilities exist to raise revenues from non-aeronautical activities, including from restaurants and food service, car parking, and rentals for concessions, retail, banking and other services. For the joint-venture airports, the regulatory challenge remains to decide on a tariff schedule that begins with recognition of the monopolistic nature of airports, accurately reflects the cost base of the airport, and places an equitable cost incidence on all users of the airport.

The bills for aviation turbine fuel (ATF) represent around 40 to 50 per cent of a domestic airline's operating cost. With several state and central surcharges ranging from customs duties to central excise to service tax and VAT levied on ATF, prices for this fuel are some of the highest in the world. Prices for ATF retailed to airlines at Indian airports are between 50 to 70 per cent higher than in other regional hubs. Indian airlines have regularly cited this as the biggest cost disadvantage they face. The rationale for pricing fuel in the manner that it is needs to be revisited.

### MANAGING THE ENVIRONMENTAL IMPACT

Compared with other modes of transport, the impact of aviation on the environment is relatively moderate in aggregate terms. However, this observation

must be tempered by the fact that, proportional to the passenger- or tonnekilometres (for freight) travelled, an aircraft is potentially the most environmentally-unfriendly mode of transport. The impact is compounded by the fact that the bulk of the greenhouse gas emissions from jet engines

All airports can raise revenues from nonaeronautical activitiesrestaurants, car parking, rentals for retail, banking and so on.

take place in the upper reaches of the atmosphere where they may have the greatest potential to cause the most environmental damage. It is important to note that the science establishing the net or relative marginal environmental impact is far from unequivocal: 'Air travel has the highest specific impact on short-term (global) warming, while on long-term warming, car travel has an equal or higher impact per passenger-kilometre'16.

The aviation industry has set itself challenging goals to dampen this impact, even in the face of global growth that is forecast to exceed 4 per cent per annum over the next few decades. These goals include the Air Transport Action Group's targets of reaching carbon-neutral growth by 2020 and that of reducing aviation's overall carbon dioxide emissions by half between 2005 and 2050.

The main greenhouse gas emissions generated by air transport are carbon dioxide (CO<sub>2</sub>), nitrogen oxides (NO<sub>v</sub>), water vapour (H<sub>2</sub>O) and particulate matter (PM). The bulk of these emissions are at source—that is, from the aircraft engines themselves—with the remainder made up of on-the-ground contributions from aviation support services. The environmental and human costs of these emissions have been discussed elsewhere in this report, and it is urgently incumbent on all participants to devise solutions to mitigate emissions and their environmental impact.

The other major source of environmental pollution from aircraft is noise. The principle sources of air-

16. Borken-Kleefeld et al. (2010, p. 5700).

craft noise are the aircraft's engines and, particularly during approach, the aircraft's flaps and landing gear. Aircraft noise levels are today typically around 20 decibels lower than they were 40 years ago. This represents a significant reduction in the acoustic energy at source and consequently, for an individual event, the noise level perceived by the listener. However, over this period, the number of air traffic movements has significantly increased, and will continue to grow. As a result, aircraft noise continues to have a very significant environmental impact around airports and is a source of disturbance to the public. Many airports in other countries have implemented noise-related charging schemes, quotas on night flights or even night curfews. As cities and airports both expand, increasing shares of India's urban populations will lie under a flight path, and will expect reasonable efforts on the part of authorities to shield them from the worst excesses of engine noise.

### **HUMAN RESOURCES**

The desired growth in Indian aviation will require the country's technical colleges and flying schools to churn out engineers, pilots, air traffic controllers and other key staff in substantially greater numbers than at present. No less important is the requirement for an improved, larger cadre of airline administrators and managers, regulatory economists and planning professionals. The internationally fungible nature of aviation service professionals means that India faces stiff competition for skilled employees. Students trained in India are lured to the rapidly expanding regional hubs by better salaries. Meanwhile, there is a shortage of pilots with sufficient experience in India. This will need to be addressed by short-term contracts with foreign pilots. These skill shortages are especially limiting to the incipient ambitions of India as a global hub for civil aviation and mechanical, repair and overhaul (MRO) work.

### **AIR CONNECTIVITY TO REMOTE AREAS**

Remoteness is a function of both geography and topography. The North East region of India is far from India's largest centres of economic activity, but the problem is compounded by relatively poor road and rail access. In turn, the poor road and rail networks in the region are at least partially a function of the difficult terrain and climatic conditions that prevail, and the expense of surmounting these. Remoteness is at least partially self-fulfilling as well. Land transport links tend to be difficult within these regions, thereby making them 'remote'. The somewhat obvious point here is that when robust transport links are extended to regions previously considered remote, they are no longer so.

Some of the insidious effects of remoteness are well-known: a lack of accessibility to education and

employment opportunities, a lack of engagement with the nation's zeitgeist, and disaffection and disinterest on the part of both the remote peoples and the rest of the country. Air travel can be the quickest, cheapest, and most environmentally-friendly class of transport links that can be extended to these regions. The challenging topography places less of a barrier to the construction of an airport than to the laying of a railway line. Arguably, the airport presents less of an environmental threat than the cutting of a new road that requires the acquisition of vastly more land and its subsequent clearance. The scattered nature of the communities can be easily accommodated within a standard hub-and-spoke framework. Connectivity within the region improves from low-cost hopping flights. The environmental costs and safety implications of a five-minute flight can be more favourable than those of an equivalent five-hour car ride over a treacherous mountain pass or riverboat journey.

The remote regions of India—the North East, Jammu and Kashmir, the Andaman and Nicobar Islands, Lakshadweep, and parts of central India—are amongst the most impoverished of the land. They stand to gain enormous economic and social benefits from being better connected with the rest of the country, and civil aviation makes a promising case for being the preferred mode to accomplish this needed connectivity.

At present, mandated Route Dispersal Guidelines (RDG) require airlines to provide service to certain remote locations as a condition of licenses to operate the more heavily-trafficked routes. The guidelines aim at 'ensuring that all players in the liberalised era deploy capacity to destinations in remote areas and participate equitably in providing air transportation to remote areas'17. By dividing the air routes into three different categories depending on their economic profitability and viability, the guidelines essentially mandate a system of internal crosssubsidisation from the profitable routes (generally, those connecting metropolitan cities), to less profitable ones. The present sentiment is that the RDGs cast a burden on the commercial health of airlines in India<sup>18</sup>. Further, there are concerns that RDGs do not achieve the intended outcomes with air connectivity largely concentrated on routes connecting state capitals, and more generally, to a very limited number of airports in remote areas. Island airports, too, remain underserved. Consequently, there is a need to devise an alternative mechanism that better serves the goals of remote-area connectivity.

### **INDIAN AVIATION TODAY**

The reforms of the 1980s and 1990s have resulted in a civil aviation landscape that is vastly different

<sup>17.</sup> NTDPC (2012, p. 115).

<sup>18.</sup> Ibid. (p. 92), citing MoCA (2011).

Table 3.2 **Estimated Gross Revenue Earned by Various Participating Sub-Sectors** (Rs billion)

SUB-SECTORS	GROSS INCOME 2012-13
Airlines	547
Scheduled	532
Non-Scheduled	15
Airports	111
AAI	69
Private	42
Maintenance, Repair and Overhaul (MRO)*	40
Air Cargo Express Industry*	190
Ground Handling*	20
Aviation Academies*	3
Total	911

Source: Respective Annual Reports, Industry Sources, Analysis: Ministry of Civil Aviation

Note: \* The income of FY 2009-10 is presented. Data for non-scheduled airlines is for 2010-11; For Air India and Alliance Air, data pertains to 2011-12.

from the anaemic State-controlled system of the post-Independence period. However, the reforms are incomplete, growing pains pervade every element of the sector, and for all of the strong fundamentals that will drive growth, substantial and uncertain headwinds remain.

Table 3.2 sets the industry in context. Scheduled airlines contribute over half the gross product of the civil aviation sector. This is only representative of the domestic and international operations of domestically incorporated airlines. The revenues earned by international airlines from their Indian operations are estimated to be around Rs 200 billion for 2010-11 but are not included in this table.

### SERVICE DELIVERY: PERFORMANCE AND RECENT TRENDS

### PASSENGER SERVICES

Since India's economic liberalisation began in 1991, domestic air traffic has grown at an annual average rate of 10.4 per cent, and in 2011-12, Indian carriers transported 60.8 million domestic and 14.3 million international passengers<sup>19</sup>. Over the last two decades, India's overall air traffic has grown 10.5 per cent domestically, 4.0 per cent internationally and 8.4 per cent overall. Not surprisingly, the most rapid period of growth has been post-sector liberalisation: from 2005-06 to 2011-12 passenger traffic grew 15.5 per cent overall, with domestic passenger CAGR of 15.8 per cent and international passenger CAGR of 14 per cent<sup>20</sup> (see Table 3.3).

Over the last two decades, domestic passenger traffic has generally grown more rapidly than international passenger traffic. This can perhaps be partially attributed to stagnating foreign tourist arrivals into India: only 6.6 million visitors in 2012 (less than 10 per cent the figure for China in that year)21. Urbanisation, pent-up demand from previously underserved cities, the entry of low-cost carriers, the expansion of the middle class, internal migration are only some of the factors that are good candidates for explaining why domestic traffic has grown faster than international traffic.

Moreover, Indian carriers have been unable to make substantial inroads into the international market for air traffic in spite of rapid economic growth (and rising foreign tourism and investment) since market liberalisation began. Indeed, in 2009-10, Indian scheduled carriers transported 34.6 per cent of international passengers to and from India, versus 31.7

Directorate General of Civil Aviation and Airports Authority of India.

NTDPC (2012, p.15), citing Directorate General of Civil Aviation, Airport Authority of India and Ministry of Civil Aviation.

World Bank and Ministry of Civil Aviation.

Table 3. 3 **Passengers Carried by Scheduled Carriers** 

YEAR	DOMESTIC	INTERNATIONAL	TOTAL
		Passengers Carried (millions)	
1990-91	7.5	6.3	13.8
2005-06	25.2	6.5	31.7
2011-12	60.8	14.3	75.2
		CAGR (per cent)	
1990-91 TO 2011-12	10.5	4.0	8.4
2005-06 TO 2011-12	15.8	14.0	15.5

Source: DGCA, AAI; Analysis: Ministry of Civil Aviation.

per cent two decades ago<sup>22</sup>. A number of factors are often cited to explain why Indian carriers transport only a third of international traffic to or from India. These include: their low utilisation of international traffic rights, entry restrictions, inherent cost disadvantages, and the foreign airlines <sup>23</sup> expansive hub airports that provide onward connections to a wider array of international destinations.

A final reason lies in the ability of foreign airlines to add or remove capacity on Indian routes more easily than domestic carriers can. The former's extensive networks allow them to rebalance capacity across the network with comparative nimbleness. Meanwhile, Indian airlines are hamstrung, because the equipment used for domestic or short-haul international travel (narrow-body jets), cannot be easily repurposed for service to destinations further afield.

This observed lack of dominance of Indian airlines in the market for international travel often prompts concern that foreign exchange is frittered away on international travel, and that carefully negotiated bilateral rights and expensive landing slots lie redundant. There are further concerns that Indian air travel could be held hostage to fickle route decisions by the foreign airlines, as well as national security implications. However, primary importance should certainly be placed on noting that all who want to travel to or from India can do so. Though not unimportant, the home of the carrier airline is a second-order concern.

There is reason to believe that Indian airlines will gain market share in coming years. Unused rights under the bilateral negotiations will be used up as the new domestic airlines of the past decade expand and become eligible under current rules for scheduling international flights. With no overnight domestic flights in India, it makes sense for the airlines to use idle planes to fly offshore even if their primary focus is the domestic market. New equipment such as the more fuel-efficient wide body aircraft, the Airbus A350 and the Boeing B787, are ideally suited to long-haul travel direct from origin to destination. With substantial domestically sourced traffic for a large variety of destinations, and in the absence of international hubs, these new aircraft could be just the ticket to boost domestic airlines' international market share. Air India has already announced plans to expand its international network to Australian airports, and to Birmingham and Moscow using the B787<sup>24</sup>.

Further liberalisation and market access reform will also help to balance market share. For example, Indian low-cost carriers' enhanced ability to fly between India and the Middle East or South and South East Asia could provide a valuable boost to international air traffic. More convenient and less expensive travel within the region, at a time when disposable incomes in India are rising quickly, will enhance international passenger flows.

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<sup>22.</sup> Directorate General of Civil Aviation; Ministry of Civil Aviation.

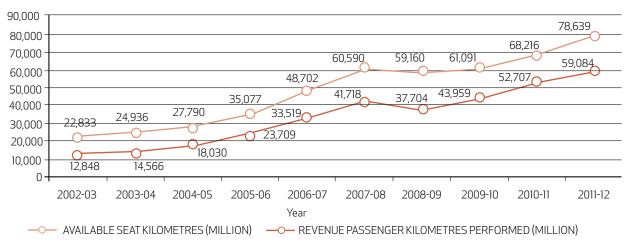
<sup>23.</sup> As examples from the past two years: American Airlines has withdrawn its service between Delhi and Chicago; Qantas no longer flies between Mumbai and Sydney (Boeing 2012).

<sup>24.</sup> Hitherto, nearly all traffic between India and Australia was carried on the airlines of Eastern Asia via hub airports in their home countries.

Figure 3.5

# Revenue Passenger Kms (RPK) and Available Seat Kms (ASK) for Scheduled Domestic Carriers





Source: DGCA.

### THE DOMESTIC MARKET

The domestic market is served by two full-service carriers: Air India (19.1 per cent share as of April 2013), and Jet Airways (17.1 per cent) which also has a low-cost subsidiary Jet Lite (5.4 per cent). Three low-cost carriers comprise the lion's share of the market: IndiGo (29.5 per cent), Go Air (9.0 per cent) and SpiceJet (19.8 per cent). In addition, there are some regional carriers.

Aviation capacity and its utilisation (see Figure 3.8) is a function of both the number and size of aircraft deployed as well as the distance travelled, which is representative of their availability for use in commercial service. So, Available Seat Kilometres (ASK) refers to the available capacity deployed by scheduled carriers across their network, and is a measure of the supply of aviation services<sup>25</sup>. On the demand side, Revenue Passenger Kilometres (RPK) refers to the number of seat-kilometres for which the carrier has earned revenue<sup>26</sup>

Figure 3.5 indicates that capacity in the domestic market has grown steadily. Both ASK and RPK moved in tandem for most of the post-liberalisation period from 1993-94, indicating that latent demand justifiably motivated capacity increases and that the new capacity was priced sensibly so that the latent demand could be actualised.

The ratio of RPK to ASK yields the passenger load factor, the most widely used measure of capacity uti-

lisation (See Table 3.4). Load factors had increased even as new private carriers added substantial capacity from 2005-06 onwards. However, in the aftermath of the global financial crises of 2008, demand declined precipitously and load factors dropped. This illustrates the difficulties that airlines face in cutting capacity in the short term, and also the importance of creating an industry that is resilient enough to weather these storms. More recently, with Kingfisher's withdrawal from the market, resurgent demand, and more cautious expansions to the network, load factors have increased. They stand at as high as 90 per cent for IndiGo, down to 75 per cent for Jet Airways.

### THE INTERNATIONAL MARKET

The market for international air travel again features Air India and Jet Airways as full-service carriers over long-haul distances. More recently, as the new private carriers IndiGo and SpiceJet have acquired experience, equipment and credibility, they have begun international service to short-haul destinations in South Asia, South East Asia and China, and to the Middle East. The international market is fragmented, with no one carrier boasting a dominant market share. The largest airline serving the international market is Jet Airways, followed by Emirates and then Air India. The top 13 carriers account for only 70 per cent of passenger traffic, as seen in Table 3.5, with around 60 carriers accounting for the remaining 30 per cent. Though it is not uncommon for as many carriers to operate to large

<sup>25. &#</sup>x27;Available Seat Kilometer' (ASK) stands for the sum of the product obtained by multiplying the total number of seats that are available in each flight by the flight stage distance.

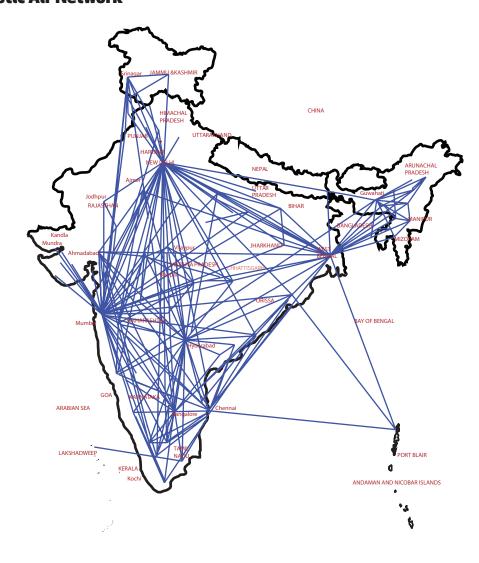
<sup>26.</sup> RPK is calculated as the sum of the product obtained by multiplying the number of revenue passengers carried on each flight stage by the stage distance, which gives the number of kilometers travelled by all passengers.

Table 3.4 **RPK and ASK of Scheduled Domestic Carriers** 

YEAR	RPK (MILLION)	ASK (MILLION)	LOAD FACTOR
1993-94	6,779	10,821	62.6
1999-00	11,420	19,089	59.8
2004-05	18,030	27,790	64.8
2005-06	23,709	35,077	67.6
2006-07	33,519	48,702	68.8
2007-08	41,718	60,590	68.8
2008-09	37,704	59,160	63.7
2009-10	43,959	61,091	71.9
2010-11	52,707	68,216	77.2
2011-12	59,084	78,639	75.1

Source: DGCA.

Figure 3.6 **India's Domestic Air Network** 



Source: NTDPC.

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Table 3.5 **Indian Operations of International Airlines, 2011-12** 

AIRLINE	PASSENGERS (M)	SHARE(PER CENT)	NUMBER OF INDIAN AIRPORTS WITH INTERNATIONAL SERVICE	NUMBER OF FOREIGN DESTINATIONS <sup>b</sup>	NUMBER OF ONWARD FOREIGN DESTINATIONS <sup>C</sup>
Jet Airways	5.45	15.7	10	20	0
Emirates	4.65	13.4	10	1	120
Air India	4.23	12.2	13	27	0
Qatar Airways	1.53	4.41	12	1	
Air Arabia	1.49	4.31	13	1	>40
Lufthansa	1.18	3.42	4	2	
Oman Air	0.95	2.75	10	1	
British Airways	0.93	2.70	5	1	
Air Lanka	0.85	2.45	7	1	45
Cathay Pacific	0.74	2.14	4	1	
Etihad	0.67	1.95	9	1	
Kingfisher	1.18	3.42		8	0
Indigo	0.41	1.19	7	4	0
SpiceJet	0.29	0.86		7	0
Others	10.09	29.10			
Total	34.80	100.00			

Source: NTDPC

Note: (a) Kingfisher ceased operations in the second half of 2012. (b) The number of foreign destinations served refers to non-stop or direct flights from Indian airports to a foreign airport. A direct flight can be a halt within or outside India en route to the final destination, but there is no change of aircraft. (c) The number of onward foreign destinations refers excludes all destinations within India.

countries with many airports, it is unusual in the international context to not have a domestic airline that dominates international traffic at any one airport or at all airports within a country.

The rights to operate international service to and from India by domestic or foreign airlines are set out in bilateral air services agreements (BASA). In the absence of open-skies agreements, where any airline from a defined region or group of countries is free to

establish the characteristics of air services offered of its own accord, a BASA identifies maximal allowances between any two countries. India has negotiated bilateral agreements with over 120 countries with many having been signed or renewed in the last wave of liberalisation of 2005-06. These agreements are negotiated on the basis of reciprocity, and specify some permutation of the number of flights, number of airports, frequency of service, and type of aircraft that can be allocated to international air

service by airlines domiciled in either of the entreating parties.

Many of the bilateral agreements lie dormant, with the rights remaining unexercised by airlines from other countries. Of these, there is little prospect of any uptake of rights on the vast majority of dormant agreements. The major critique levelled on the others is that they are overly generous in granting access to foreign airlines at a time that the domestic ones are uninterested or incapable of exercising their rights, face Indian regulatory barriers, or find it uneconomical to do so. Indeed, it is estimated that around 65 per cent of the rights allocated to foreign airlines are exercised, and only around 30 per cent of rights allocated to Indian airlines are used<sup>27</sup>.

In a review of these bilateral agreements, the Comptroller and Attorney General of India (CAG) found that though the liberalised policy towards bilateral entitlements benefited the Indian traveller considerably in terms of choice and lower tariffs, the timing of the liberalisation left much to be desired. The merger of Air India and Indian Airlines was relatively new, and many aircraft purchased by these airlines that would allow them to make full use of the bilateral rights would only be delivered several years hence. Further, the major airports of India that would serve as natural gateways to expanded international traffic were in the process of being modernised. The CAG also took issue with the spirit of the agreements being violated by international regulators and carriers. The agreements are intended to serve demand for bilateral point-to-point travel. But the CAG concluded that much of the rights were being used to soak up demand for onward travel from offshore hubs, the so-called 6th freedom of the air. (Box 3.1).

A BASA can have a substantial effect on the patterns of air traffic. For example, the expansion of capacities between India and certain hub airports, together with the easing of foreign ownership rules, could result in realignment of direct traffic from Indian cities to such hubs, making use of the foreign airlines' extensive onward network. As a result, traffic that may have been aggregated at Indian hubs like Delhi and Mumbai from the regional cities for onward service on international routes could then shift to the foreign hub.

Indian airlines that seek to expand overseas must also contend with the so-called '20-5 rule'. Under this rule, scheduled domestic carriers must amass a minimum fleet of 20 aircraft and have completed five years of domestic flight services, before being eligible for licenses to provide international service. Foreign airlines servicing Indian cities are generally not subject to similar requirements. As explained above, these airlines must idle aircraft when they cannot be deployed on domestic routes, cannot take advantage of market opportunities, and must give up any possible first-mover advantages to foreign airlines<sup>26</sup>. There does not appear to be a strong justification for the persistence of this rule.

### **GENERAL AVIATION**

General aviation refers to the non-scheduled domestic and international flights of approved operators, charter operations, business and private jet travel, helicopter services and the non-scheduled travel of scheduled operators. According to the Directorate General of Civil Aviation (DGCA), the general aviation fleet in India comprises around 800 small aircraft and 300 helicopters. Around 20 per cent of this fleet is likely to be more than 25 years old and may not be operational. The number of approved non-scheduled operators is now in excess of 220, a substantial increase over the 36 registered in the year 2000.

The drivers of the demand for general aviation are diverse. Helicopters perform a multitude of services where airborne versatility is required. This includes the provision of emergency medical treatment and evacuation, city-to-airport transfers, airborne law enforcement, aerial photography, relief and rescue operations, news reporting, and agricultural activities like spraying. As the economy grows and as technologies and incomes advance, demand for each of these value-added services provided by the helicopter industry is likely to increase.

Charter services play an increasingly central role in ferrying tourists to India. As appreciation of India's offerings increases, and as the tourism industry itself becomes regularised, the country is more likely to attract the package tourist, the one who is more content to leave the organisation of a vacation up to the professionals. A steady stream of charter flights from Eastern Europe already plies routes to the beaches of Goa and Kerala every winter. It is anticipated that international charter flights will increase, and the itineraries will become more complex with time by the inclusion of multiple domestic stops. Finally, with corporate growth and in the ranks of the very rich, it is easy to foreshadow increased demand for travel by private aircraft.

### FREIGHT AND CARGO SERVICES

The demand for air cargo transportation has increased significantly in recent years, growing at approximately 8.6 per cent CAGR since 1990-91. Today, air cargo represents approximately 10 per

<sup>27.</sup> See MoCA (2011, p. 51)

<sup>28.</sup> The rule may also prompt perverse outcomes in other ways. The two-year old Kingfisher's purchase of a 26 per cent stake in Air Deccan in 2007 at what now seems to be an excessively high price was prompted in large part by the former's desire to take advantage of the latter's more extensive operational experience to circumvent the 20-5 rule.

### Box 3.1

### Freedoms of the Air

Bilateral and multilateral agreements on commercial aviation between countries are negotiated on the basis of freedoms of the air. Similar to concepts in marine shipping, these freedoms refer to rights to transport passengers and goods under a variety of circumstances. The first two freedoms concern the right of an airline to use airspace and air facilities in countries other than where the airline is registered without actually providing any service. Specifically, the first freedom allows an airline to overfly a country, and also permits the country to charge for this right. Airlines use rights under the second freedom to make technical halts, such as for refuelling or maintenance, at airports outside their home country without providing any services for passenger or goods to or from these airports.

Freedoms 3 and 4 allow an airline to transport goods and passengers from its home country to others and vice versa. The fifth freedom allows an airline to provide service between two foreign countries as part of the normal course of service to and from its home country. For example, Jet Airways exercises the rights available under this freedom to service the Brussels-New York market, as these flights arise in the normal course of its international services from Indian cities. The first five freedoms are enshrined in the Convention on International Civil Aviation of 1944.

The remaining four freedoms are 'unofficial' insofar as they are not subjects of the Convention. They have gained prominence in recent times as newer route and scheduling patterns have emerged. The sixth freedom is behind the rise of the entrepot hub airports of Asia such as Singapore, Dubai and Abu Dhabi. Under the rights conferred by this freedom, airlines may provide service between two foreign countries by directing traffic through their home countries. The seventh freedom is similar, except that it waives the requirement of a home-country halt while permitting an airline to offer service between two foreign countries. This freedom is rarely exercised except by airlines in countries that are signatory to open-skies agreements. For example, low-cost carriers link many international city pairs in Europe without heed for halts in home country hubs.

'Cabotage' is a shipping term that refers to service provided between two ports in a country by a vessel flag-registered in another country. The eighth and ninth freedoms extend this concept to air travel. The eight freedom permits an airline to offer service between two airports in a foreign country as part of continuing service to its home country. The ninth freedom waives the continuing service requirement.

cent of the Indian airline industry's revenues and 35 per cent of the value of goods traded internationally. Scheduled Indian carriers have lost significant international freight market share in the last 20 years. When the liberalisation of the markets began in 1990-91, Indian carriers held 36.9 per cent market share in total cargo carried. Unfortunately, in 2009-2010, domestic carriers transported only 16.1 per cent total cargo while foreign carriers were responsible for 83.9 per cent total cargo carried to and from India that same year<sup>29</sup>.

Indian cargo carriers' paltry market share is largely due to foreign carriers' rapid entry into the sector after the launch of India's Air Cargo Open Sky policy in 1990, at which time Air India was the only major domestic airline equipped to handle cargo. Sensing

a longer-term growth opportunity and capitalising upon their own economies of scale and scope, international carriers were aggressive at filling India's domestic market gap. Consequently, international carriers now enjoy a stronghold over India's cargo sector.

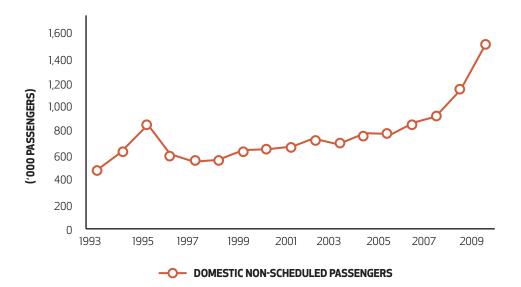
Long-term growth rates for international and domestic cargo are largely similar. That said—and in a trend that parallels recent passenger growth rates—recent trends suggest that domestic air cargo is growing at a faster rate than international cargo to and from India. Not surprisingly, air cargo growth rates are generally susceptible to fluctuations in India's GDP growth rate (and in fact sometimes seem to foreshadow an economic slowdown).

29. Directorate General of Civil Aviation; Ministry of Civil Aviation.

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Figure 3.7

Domestic Passenger Traffic Carried by Non-Scheduled Operators



Source: NTDPC (2012).

Note: More recently, there has been a substantial decline in passengers carried by non-scheduled operators. In 2010, only 660,000 domestic passengers were carried by non-scheduled operators, rising to 890,000 in 2011.

Since 2003-04, the share of international air cargo that passes through Delhi and Mumbai has declined from 66 per cent to 57 per cent, while a greater proportion of cargo now passes through Chennai (20 per cent, up from 17 per cent in 2003-04) and Bengaluru (9 per cent, up from 7 per cent previously). The total volumes of cargo shipped stood at around 1.2 million metric tonnes for 2010-11, with imports accounting for about 60 per cent of this. Imports and exports forwarded via air have exhibited remarkably similar annual growth rates over the past 20 years, being around 7.5 per cent for imports and 11 per cent for exports. Thus, if trends persist, we may expect the volume disparity between inbound and outbound freight to disappear with time, providing greater efficiencies.

With respect to domestic movements of freight, the interesting trend is the slow but steady decline in the use of passenger aircraft to transport cargo, and the rise of the dedicated freight service<sup>30</sup>. This can be attributed to the time-sensitive demands of the logistics industry which requires extreme efficiency in processing air freight.

### **AIRPORT PERFORMANCE**

At present, there are a total of 125 airports in India, of which 84 are currently operational. Six of these airports—Delhi, Mumbai, Bengaluru, Nagpur, Hyderabad and Cochin—are run via a PPP model and currently handle approximately 60 per cent of India's total air traffic. AAI is responsible for the remaining airports, 84 of which are operational. Additionally, there are eight airports that are either completely privately owned or owned by their respective state governments31. Fifteen airports are designated as *major*; the AERA-determined criterion for this designation is an airport with an annual throughput in excess of 1.5 million passengers<sup>32</sup>. Of these 15, the six largest airports associated with India's six largest cities—Delhi, Mumbai, Kolkata, Chennai, Hyderabad, Bengaluru—are called metro airports.

Together, the six metro airports have the capacity to process 171 million passengers annually. This is equivalent to 78 per cent of the total capacity of all Indian airports, which is 214 million passengers.

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<sup>30.</sup> Over the past 10 years, the share of cargo transported in the belly of passenger service aircraft has declined from 89 to 83 per cent.

<sup>31.</sup> Jamshedpur, Latur, Lengpui, Mundra, Nanded, Baramati, Puttaparthy and Vidyanagar.

<sup>32.</sup> Currently, these airports are declared major: Delhi, Mumbai, Chennaí, Bengalúru, Kolkata, Hyderabad, Cochin, Ahmedabad, Goa, Thiruvananthapuram, Guwahati, Jaipur, Kozikhode, Lucknow and Pune.

### Table 3.6

### **Cargo Carried on Scheduled Flights**

VEAR	CARGO CARRIED (IN '000 MT)				
YEAR	INTERNATIONAL	DOMESTIC	TOTAL		
1990-91	231	97	328		
1995-96	348	113	461		
2003-04	617	227	844		
2010-11	1,244	476	1,720		
	CAGR (per cent)				
(1995-96 TO 2003-04)	7.4	9.1	7.8		
(2004-05 TO 2010-11)	9.1	8.9	9.0		
(1995-96 TO 2010-11)	8.9	10.0	9.2		
(1990-91 TO 2010-11)	8.8	8.3	8.6		

Source: DGCA, Analysis: Ministry of Civil Aviation

And as a final decomposition, note that the two airports of Delhi and Mumbai together account for 41 per cent of the total passenger throughput of Indian airports. This highlights both the importance of the two airports in the current network schema, but also the potential for rebalancing away from these airports as growth becomes more widespread<sup>33</sup>.

Currently, only seven out of AAI's 89 operational airports are profitable, in spite of the government's aggressive Rs 124 billion capital investment programme under the 11th Five Year Plan (2007-12), which was intended to upgrade and modernise India's non-metro airports by improving the technology and manpower at these airports, so as to enhance efficiency and reduce costs over time.

### PASSENGER MOVEMENT AT AIRPORTS

In 2011-12, including arrivals and departures, approximately 163 million passengers were carried by air, either domestically or internationally. Greater numbers of passengers were processed by airports on domestic routes, and this has been growing more rapidly than international passenger traffic: the percentage of domestic passengers as a proportion of total passengers processed has increased from 68 per cent in 2004-05 to 74 per cent in 2010-11. Similarly, domestic CAGR has grown at approximately 18 per cent over the last six years versus approximately 12 per cent international CAGR during that same period<sup>34</sup>. Table 3.7 provides additional information regarding passenger traffic growth over the last 15 years35.

### **CARGO MOVEMENT AT AIRPORTS**

Cargo handled at Indian airports reached 2.28 million metric tonnes (MMT) in 2011-12 after growing at approximately 11 per cent CAGR over the previous years, though this comprised a small decline over the previous fiscal year. Of this, nearly 90 per cent was processed at one of the six metro airports. On the back of an expansion in domestic trade, domestic cargo has grown at a relatively more rapid pace versus international cargo during that period<sup>36</sup>. International cargo, accounting for two-thirds of total cargo handled, passes primarily through India's the major metropolitan airports. The airports in Delhi and Mumbai alone handle approximately 50 per cent of India's total cargo. Some airports, such as Pune, have become more important as regional hubs for cargo than for the passengers processed there.

Table 3.9 provides additional information regarding cargo traffic growth over the last 15 years<sup>37</sup>.

The average weight load factor of air cargo over the last five years was approximately 62 per cent, reflecting significant unused capacity. Air cargo has not grown at the same rapid clip as certain other transport modes (e.g., marine cargo), with five-year air

This will not necessarily apply if either or both of the Delhi and Mumbai airports become true international hubs.

Airport Authority of India and Ministry of Civil Aviation. NTDPC (2012, p. 51).

Airport Authority of India and Ministry of Civil Aviation.

Table 3.7 **Passengers Throughput**(Millions)

YEAR	DOMESTIC	INTERNATIONAL	TOTAL	
1995-96	26	11	37	
2004-05	40	19	59	
2010-11	106	38	144	
2011-12	122	41	163	
	CAGR (per cent)			
1995-96 TO 2004-05	4.9	6.3	5.3	
2004-05 TO 2011-12	17.2	11.5	15.6	
1995-96 TO 2010-11	10.1	8.5	9.7	

Table 3.8 **Annual Terminal Capacity and Passenger Movement at Major Airports, 2010-11** 

MAJOR AIRPORTS	ANNUAL CAPACITY (MILLION)	PASSENGER TRAFFIC HANDLED (MILLION)	CAPACITY UTILISATION (PER CENT)
Mumbai	29.07	29.00	100
Delhi	60.00	29.94	50
Chennai	23.00	12.05	52
Bengaluru	11.50	11.59	101
Kolkata	24.10	9.63	40
Hyderabad	12.00	7.60	63
Cochin	5.00	4.34	87
Ahmedabad	4.02	4.04	101
Goa	3.23	3.08	95
Thiruvananthapuram	1.79	2.53	141
Guwahati	1.15	1.93	168
Jaipur	1.16	1.66	143
Calicut	1.85	2.06	111
Lucknow	1.21	1.58	130
Pune	1.12	2.81	251

Source: NTDPC (2012).

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Table 3.9 **Cargo Handled at Indian Airports** ('000 metric tonnes)

YEAR	DOMESTIC INTERNATIONAL		TOTAL		
	Cargo Handled ('000 MMT)				
1995-96	222	458	680		
2004-05	490	831	1,321		
2010-11	888	1,504	2,391		
2011-12	812	1,468	2,280		
	CAGR (per cent)				
1995-96 TO 2004-05	9.2	6.8	7.7		
2004-05 TO 2010-11	7.3	8.8	6.1		
1995-96 TO 2010-11	8.3	7.3	7.0		

Source: NTDPC (2012).

cargo CAGR standing at approximately 11 per cent, substantially lower than India's overall export and import growth rates (approximately 15.1 per cent and 17.3 per cent over the same time horizon). Additionally, as mentioned earlier, the amount of air cargo volume that all Indian airports handle is less than that handled by a number of individual airports around the world, including Hong Kong, Memphis, Shanghai, Incheon, Anchorage and Paris. These facts, coupled with forecasted trade and economic expansion, suggest that significant growth opportunities exist for India's cargo sector. The need for attention to improving infrastructure and policies around the sector is thus critical.

### CIVIL AVIATION IN INDIA OVER THE **NEXT 20 YEARS**

What should India's civil aviation sector look like by 2032, the end of the 15th Five Year Plan period? What outcomes does the country require such that aviation supports its growth agenda, and which policies will deliver these outcomes? As with chapters detailing the discussion on infrastructure investment in other transport modes, it is helpful to begin with a vision for the ideal civil aviation milieu of 2032. A shared vision together with derived qualitative and quantitative goals is more likely to result in a coherent, comprehensive network that best addresses India's socio-economic needs and wants. It can serve as a valuable communication device in selling infrastructure policy and decisions to the populace. Equally, it can serve to hold to account the public and private institutions that are responsible for designing, planning, commissioning, building, operating, managing and maintaining India's civil aviation network.'

### **GROWTH DRIVERS FOR INDIAN AVIATION**

This subsection only considers the fundamental drivers, the long-term secular trends that will underpin demand for aviation services, and will be responsible for catapulting the Indian civil aviation sector from the ninth- to the third-largest market worldwide over the next decade. The size of the market will obviously depend on the supply response as well. Conditional on the needed infrastructure and on accommodative policy, it is assumed that the private sector will respond to market forces and supply the requisite additional capacities for passenger and freight transport.

Growing economic activity will result in more business and leisure travel. The GDP-elasticity of demand for passenger aviation services has been usually estimated at between 1.3 and 1.8 in several international studies<sup>38</sup>. At a 7 per cent growth rate (implying a doubling of GDP in 10 years), the demand for passenger aviation could increase nearly threefold. Further, with the bulk of GDP growth being fueled by growth in industry and services, the flowon demand for aviation will be direct. In the longer term, as India becomes a middle-income country, the growth decompositions will undoubtedly be different from today. Even so, as gross trade increases, the demand for aviation services can be expected to remain strong.

38. NTDPC (2012, p. 37, Table 12).

By 2020-21, the average Indian will undertake 0.12 domestic air trips per year. This is less than what the annual trip rate today for the average Chinese (0.15), the average Brazilian (0.25), and the average Malaysian (0.54).

> India's middle class—160 million strong as of 2010 is expected to rise to 547 million, or 37 per cent India's total population, by 2025<sup>39</sup>. This middle class, with higher disposable incomes, can be expected to express the same preferences for domestic and international travel for leisure, education and business that today's middle classes do. Further, as incomes rise, airfares will constitute a smaller share of disposable income, increasing demand. The new middle classes are likely to substitute away from road and rail in favour of air travel, whenever the latter presents a viable advantage in terms of cost and time. Meanwhile, as India's young population continues to mature and reaches working age, increasing numbers of youth will seek to take advantage of employment and education opportunities elsewhere, expanding the domestic passenger base.

> The McKinsey Global Institute projects that India's urban population will reach 590 million by 2030. By this time, it is estimated that India will have 68 cities with population of greater than one million, and six cities of more than 10 million<sup>40</sup>. Even if the economic and demographic factors noted above apply in reduced strength than envisaged, the greater concentration of the nation's population in cities will make air travel naturally more attractive. As populations become concentrated, demand for point-topoint travel increases, thereby boosting demand for air travel relative to that for road and rail transport that are better suited to distributed populations.

> Tourism is another important growth factor. The sector continues to grow on the back of recent economic growth, and better air transport will continue to increase both domestic and international tourism in India. Domestic tourist visits within India grew to over 1 billion for the first time in 2012, and the number of foreign tourist arrivals to India has grown to 6.6 million from 2.3 million in 200241.

> The Indian government's stated goal of enhancing connectivity in remote, inaccessible regions of the country has created the potential for growing demand from these new regions. Finally, there is significant untapped market potential generally. Air traffic density in India remains very low versus developed nations as well as for India's emerging

market peers (e.g., Brazil and China, where densities are three and four times higher respectively), signalling a key opportunity for sector development.

Finally, some other factors that will support growing future demand for aviation include:

- Global Integration of Business. Greater economic activity and the subsequent greater integration of businesses globally will lead to increasing cross-border business travel over time and in turn, growth in civil aviation.
- Shifting Traffic Patterns. In line with global economic forecasts, air traffic will continue to shift away from North America and Europe and toward Asia-Pacific over time. By 2030-31, Airbus forecasts that 25.2 per cent of global RPK will be from Asia-Pacific (versus 19.0 per cent today)42.
- International Market Access. While Open Sky Agreements have increased competition in international air travel, so too have they increased the size and scope of the market itself. Similarly, further deregulation and market opening should help to enhance international passenger and cargo growth for Indian carriers.

On the supply side, growth in India's low-cost sector since 2004 has made air travel accessible to a broader swathe of the population, stimulating new demand. Low-cost carriers (including the LCC brands of fullcost operators) constituted over 65 per cent of the total market share in 2012, as domestic traffic continues to rapidly shift toward LCCs. As certain low-cost operators (such as IndiGo) achieve financial success, we believe that this trend should continue over time. Indeed, the only airline to have evinced interest and made formal forays to enter the Indian market at this time is Air Asia, a subsidiary of an established low-cost Malaysian carrier<sup>43</sup>. Low-cost carriers are especially attracted to serving non-metropolitan cities, the so-called Tier-II or Tier-III towns. While there may be already some connectivity between these towns and the metros, there is a lack of competition relative to traffic between a metro city-pair. This, and the government's new commitment to expand airport capacity or develop new airports in these towns, will only serve to make them more attractive to LCCs.

Further on the supply side, private-sector participation in India's airports—Rs 300 billion invested in the last five years alone—has expanded airport capacity and allowed airlines to schedule more

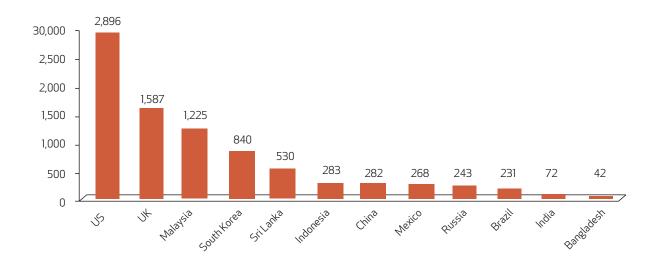
Shukla (2010)

NTDPC (2012, p. 29)

Ministry of Tourism (2013). Airbus Global Market Forecast 2011-2030.

Air Asia is a joint venture between a Malaysian LCC of the same name, Tata Sons, and a Delhi-based conglomerate, Telstra Tradeplace, which owns Hindustan Aerosystems, a manufacturer of aviation-related hardware and other products.

Figure 3.8 **Air Passengers Per Million Urban Population ('000)** 



1,000 PASSENGERS PER MILLION URBAN CAPITA

Source: NTDPC (2012), based on McKinsey & Co., and World Bank data. Data for India is from 2010; for other markets from 2008-09.

flights to these airports. The government has cited India's rapidly expanding air transport network, together with massive investments in airport infrastructure, as key reasons for the surge in air passenger traffic in India.

### TRAFFIC FORECAST FOR INDIAN AVIATION

The first task of an infrastructure planning exercise is to forecast the likely passenger demand that the aviation infrastructure of the future must service44. The airline industry will rely on the forecast to prepare a fleet acquisition plan. Efforts at training the appropriate numbers of skilled staff are contingent on the forecast, as is the planning for the provision of ancillary services like MRO, ground handling services, and others. The Working Group's forecast is based on an econometric model that relates GDP to the demand for the carriage of passenger and freight traffic. These exercises yield GDPgrowth elasticities for passenger and freight traffic, thus providing a simple linear relationship between expected future GDP and the expected future demand for domestic and international travel<sup>45</sup>. These elasticities were measured at 1.7 and 3.1 for domestic and international passenger travel, and at 1.4 and 1.3 for domestic and international cargo movement respectively. The results were shown to be robust to several choices of the measure of demand, and also in broad agreement with eight other planning exercises conducted by various airports or countries.

To forecast traffic, assumptions are made on the growth path of future GDP. The Working Group chose to assume growth rates for domestic GDP that ranged between 8.5 per cent in the near term, to 6.0 per cent in the long term. This yields the results summarised in Table 3.10.

The domestic air traffic carried by scheduled airlines is projected to be about 164 million passengers in 2020-21, about three times more than the 54 million carried in 2010-11. This is less than the growth in traffic achieved in the 10 years to 2010-11. Similarly, international passenger traffic is anticipated to be around 92 million in 2020-21. This too is a smaller multiple than what the rise in traffic was between 2000-01 and 2010-11. With aviation yet to become truly accessible to the Indian masses, these comparisons would suggest that the forecasts are suitably conservative. They also agree comfortably with forecasts produced by other agencies as seen in Figure 3.10. (However, traffic levels forecast by MoCA for 2030-31 are around one-third higher than those estimated by other agencies.) A final reality check on the forecast is from the observation that by 2020-21, the average Indian will undertake 0.12 domestic air trips per year. This is less than what the annual trip rate today for the average Chinese (0.15), the average Brazilian (0.25), and the average Malaysian (0.54).

Table 3.12 highlights forecasts for cargo traffic, with both domestic and international volumes growing by around 11 per cent per annum. Again, these are

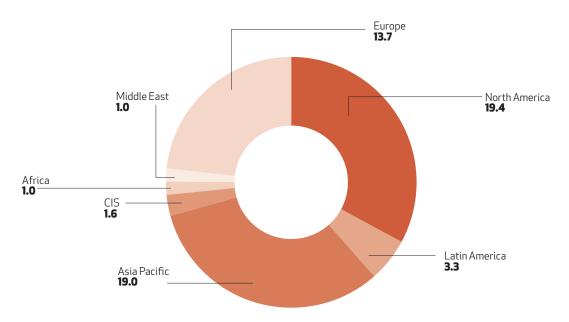
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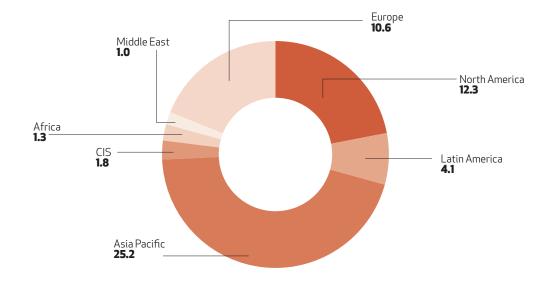
<sup>44.</sup> This subsection summarises the results of a forecasting exercise conducted by the Working Group of the NTDPC (2012) on Civil Aviation. Full details are available in Chapter 4 of the report of the Working Group.

<sup>45.</sup> The defining relationship for domestic passenger travel, and domestic and international cargo movement was with domestic GDP. The defining relationship for international passenger travel, was with international GDP.

Figure 3. 9 **Expected Changes in Demand for Passenger Travel, by Region** [Per cent]

Figures are per cent share of global RPK and are for 2010-11 (top panel), and 2030-31 (bottom panel).





Source: NTDPC (2012).

### Box 3.2

### **Secondary Airports**

Most Indian cities have one operational airport or airfield that can accommodate scheduled, commercial air services. This is in stark contrast to the situation in other countries, where cities often have two or more airports. For example, London boasts of five airports and New York four. Paris, Chicago, Frankfurt, Shanghai, Beijing, Tokyo, Rome, Stockholm, Melbourne, and many other global cities of note have two or more airports. Several substantially smaller cities and cities in developing economies are home to two or more airports: Phoenix, Dallas, Sao Paulo, Johannesburg, Rio de Janeiro, Istanbul and others.

In some instances, the need for multiple airports to serve the same urban agglomerations has arisen from capacity constraints. (Civil aviation has grown so rapidly in China over the past decade that both Beijing and Shanghai have commissioned new airports only a few years after completing major airport projects in the same cities.) In others, the urban agglomeration has steadily grown to encompass several airfields that lay outside historical city boundaries.

The major advantage of multiple airports is choice. Where airports ownership is privatised and deregulated, the airports compete amongst each other to attract airlines. For example, each of the five airports of London has developed distinct characters and offers a distinct service profile. Heathrow serves as the major regional and long-distance hub for international travel, with Gatwick rapidly rising in prominence as Heathrow reaches capacity limits. London City airport, located only a few miles away from the centres of financial and political activity, serves as a convenient short-haul option for business passengers. Meanwhile, Stansted and Luton are at considerable distances from the city centre, and have less stringent noise abatement restrictions allowing greater operational freedom. These airports have aggressively pursued business from low-cost carriers.

In fact, the rapid rise of low cost aviation owes much to the presence of secondary airports in cities. When Ryanair, one of the pioneer European low-cost carriers, flies from London to Stockholm, it does so from Stansted (50 km from London city centre) to Västerås (100 km from Stockholm city centre).

As urban agglomerations grow, it is not just airlines that benefit from choice. A four-hour door-to-door trip via air from a Delhi address to a Mumbai address can easily double in duration if the origin is somewhere in the expanses of Greater Noida and the destination in Thane or Vasai. The presence of a secondary airport affords passengers much in the way of time saving choices.

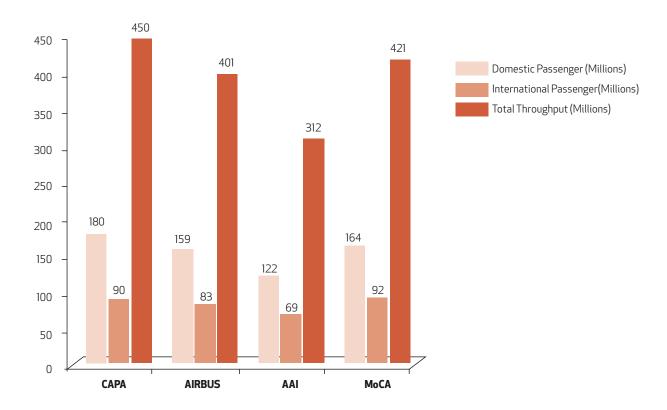
Table 3.10 **Forecast of Passenger Traffic** 

YEAR	DOMESTIC (MILLIONS)	RESULTANT CAGR (PER CENT)	INTERNATIONAL (MILLIONS)	RESULTANT CAGR (PER CENT)	TOTAL (MILLIONS)	CAGR (PER CENT)
2010-11 (Actual)	53.9	-	37.9	-	91.8	-
2015-16	94.1	11.8	59.4	9.4	153.5	10.8
2020-21	164.4	11.8	91.9	9.3	256.3	10.8
2030-31	437.9	11.0	217	9.1	654.9	10.3

Source: DGCA and MoCA estimates.

Figure 3. 10

A Comparison of Passenger Traffic Forecasts for 2020-21



Source: NTDPC (2012), from CAPA, Airbus, AAI and MoCA estimates, p. 43.

broadly in line with estimates produced by other agencies<sup>46</sup>.

# TRAFFIC IMPLICATIONS FOR AIRPORT CAPACITY

Every passenger travelling by air must journey through two airports, with the possibility of more if several sectors are on the itinerary. The traffic increases forecast above must essentially be doubled to arrive at estimates of passenger throughput at domestic Indian airport terminals. For international travel, only one terminal will be located in India, but a five per cent adjustment is made to traffic figures to account for passengers transiting to other airports. If a strategy to develop Indian airports as global hubs is desired and successful, the throughput estimates for these airports must obviously be adjusted to account for a substantial bulk of transit passengers. The same considerations noted here also apply to the movement of cargo traffic. Consequently, the airport throughput noted in Tables 3.13 and 3.14 should be considered a conservative estimate conditional on the traffic forecast.

Total passenger movement at Indian airports is expected to be three times present levels by 2020-21, and seven times larger by 2030-31. Growth is expected to be driven marginally more by domestic passenger traffic, on account of the untapped market potential

noted above. Similar growth multiples are expected for cargo throughput over the next 10 and 20 years.

# REQUIRED INVESTMENT IN AVIATION INFRASTRUCTURE

The previous section noted a set of traffic forecasts for domestic and international air transport of passengers and cargo. This section describes the preferred supply response in the form of infrastructure spending required to expand capacity. The investment for aviation infrastructure consists of the development and expansion works at new and existing airports, and of the acquisition of aircraft to make use of the extra capacity at airport terminals. The assumption in this report is that, given a policy environment conducive to investment, the private sector will increase aircraft numbers and service delivery capacity as required to meet demand. Thus planning for the future consists of identifying the likely airport development required, and the creation of a sensible, market-friendly, policy environment.

### **AIRPORTS**

Airports in India are largely under the administrative purview of the Airports Authority of India. The AAI implements long-term government policy and

46. NTDPC (2012) also presents these forecasts.

 $\textbf{NATIONAL TRANSPORT DEVELOPMENT POLICY COMMITTEE} \mid 2013$ 

Table 3.11 **Forecast of Non-Scheduled Domestic Passenger Traffic** 

YEAR	DOMESTIC (MILLION)	CAGR (PER CENT)
2009-10 (Actual)	1.49	-
2015-16	1.98	4.8
2020-21	2.52	4.9
2030-31	3.89	4.7

Source: NTDPC (2012).

Table 3.12 **Forecast of Cargo Traffic** 

YEAR	DOMESTIC ('000 MT)	CAGR (PER CENT)	INTERNATIONAL ('000 MT)	RESULTANT CAGR (PER CENT)	TOTAL ('000 MT)	CAGR (PER CENT)
2010-11 (Actual)	475.5	-	1,243.9	-	1,719.4	-
2015-16	835.3	11.9	2,113.0	11.2	2,948.3	11.4
2020-21	1,436.0	11.7	3,500.0	10.9	4,936.0	11.1
2030-31	3,622.8	10.7	8,238.4	9.9	11,861.2	10.1

Source: NTDPC (2012).

Table 3.13 **Expected Passenger Throughput at Indian Airports** 

YEAR	DOMESTIC (MILLION)	RESULTANT CAGR (PER CENT)	INTERNATIONAL (MILLION)	RESULTANT CAGR (PER CENT)	TOTAL (MILLION)	CAGR (PER CENT)
2010-11 (Actual)	106		38		144	
2015-16	188	12.1	62	10.3	250	11.7
2020-21	329	12.0	97	9.8	426	11.5
2025-26	546	11.5	147	9.4	693	11.0
2030-31	876	11.1	228	9.4	1,104	10.7

Source: Ministry of Civil Aviation Estimates.

Table 3.14 **Expected Cargo Throughput at Indian Airports** 

YEAR	DOMESTIC ('000 MT)	CAGR (PER CENT)	INTERNATIONAL ('000 MT)	RESULTANT CAGR (PER CENT)	TOTAL ('000 MT)	CAGR (PER CENT)
2010-11 (Actual)	888	-	1,504	-	2,392	-
2015-16	1,671	13.5	2,133	7.0	3,784	11.4
2020-21	2,872	12.5	3,500	9.0	6,372	11.1
2025-26	4,652	11.7	5,472	9.0	10,124	10.6
2030-31	7,246	11.1	8,239	8.9	15,485	10.1

Source: Airports Authority of India/Ministry of Civil Aviation Estimates.

direction on the development of airports. In recent years, six of the largest and systemically important airports in urgent need of expansion or redevelopment have had their ownership transferred into public-private joint-venture enterprises, under Operation, Maintenance and Development agreements. The private partners in these enterprises have supplied much-needed financing in exchange for a majority equity holding. The AAI has retained a minority stake in the joint venture companies and shares in the revenue generated. It also continues to supply air navigation at these, and all other airports. The tariff structure of these airports is regulated by AERA. A plan for developing airport infrastructure must therefore identify the location of any new development or expansion, the size of this exercise, and must also identify clear criteria for how the development works are to be funded and administered, whether through the AAI, or through a PPP joint venture.

The Ministry of Civil Aviation has established that the unit cost of creating additional new terminal capacity that is capable of processing 1 million passengers per annum is in the range of Rs 2.75 to 3 billion at 2011 prices. Where this capacity is to be created by enlarging existing infrastructure, i.e., as brownfield development, the unit costs are somewhat larger at Rs 4 billion. Though the land acquisition costs for greenfield developments should indicate a higher unit cost, the received wisdom is that capacity expansions at existing busy airports are made difficult by the need to plan around everyday operations.

According to Table 3.7, Indian airports processed 106 million domestic passengers and 38 million international passengers in 2010-11. This is expected to grow to 329 million and 97 million by 2020-21, and to 876

and 228 million by 2030-31 respectively. As standard international practice, a 30 per cent increment on these forecasts is applied for infrastructure planning to future-proof investments by ensuring sufficient slack in the added capacity: mid-course correction of design and development on account of changes in traffic forecasts will only result in higher outlays.

These facts lead to a straightforward assessment of the required capacity and investment in airport infrastructure as summarised in Table 3.15. For each Plan period through to 15th Five Year Plan concluding in 2032, the analytical framework apportions traffic between greenfield and other airports. This is then translated into a capacity requirement as described above, together with the 30 per cent margin, and by applying the unit costs, a total anticipated outlay for each plan is acquired.

A total investment of Rs 5,900 billion is estimated to be required for airport infrastructure development by 2030-31. This investment will result in creation of additional capacity of around 1,700 million passengers per annum (mmpa), out of which 383 mppa capacity will come up in greenfield airports alone. This additional capacity will help in catering to the forecasted passenger traffic of 1177 mppa by 2030-31 in a seamless and safe manner.

Unlike with roads or rail networks where investment output can be measured in so many kilometres of roads cut or rails laid of a certain type, investment in aviation is lumpier. Some airports will be larger than others by several orders of magnitude, and the unit costs of construction will be idiosyncratic. We may be able to differentiate between the unit cost of an expressway with that of a village road; however, it is an altogether different matter to compare unit costs of capacity expansion at airports in Delhi

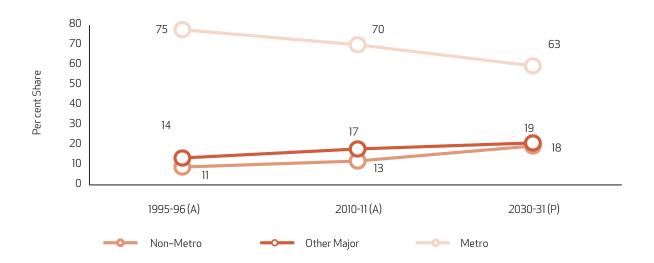
Investment Requirement in India for Airport-Related Infrastructure by 2031-32 (Passenger Services) Table 3.15

INVESTMENT REQUIRED (RS BILLION) TOTAL 5,896 2,786 1,741 429 923 8 OTHER THAN GREEN-FIELD 4,825 2,275 1,474 369 707 GREEN-FIELD 1,071 268 215 21 9 <u>8</u> ADDITIONAL CAPACITY REQUIRED AT AIRPORTS TOTAL 1,705 272 809 123 501 OTHER THAN GREEN-FIELD 1,322 404 623 (16) 194 101 GREEN-FIELD 383 186 22 78 97 9 ESTIMATED CAPACITY REQUIREMENT AT AIRPORTS TOTAL 1,530 365 993 615 211 OTHER THAN GREEN-FIELD 1,224 492 795 314 18 GREEN-FIELD 306 123 199 29 21 1,177 473 764 162 281 TOTAL TRAFFIC APPORTIONED AMONG AIRPORTS OTHER THAN GREEN-FIELD 242 378 942 139 611 GREEN-FIELD 235 153 23 39 95 1,177 473 162 281 764 2031-32 2021-22 2011-12 2026-27 2016-17 11<sup>th</sup> FIVE YEAR PLAN 12™FIVE YEAR PLAN 13™FIVE YEAR PLAN 14™FIVE YEARPLAN 15™FIVE YEARPLAN PLAN PERIOD TOTAL

Source: NTDPC.

Figure 3. 11

Throughput at Major, Non-Major and Metro Airports



Source: NTDPC (2012), from MoCA analysis of AAI data Note: (A) refers to Actual and (P) refers to Projected.

versus Patna, or Mumbai versus Aizawl. Nonetheless, the preceding analysis has lumped together all the different types of capacity expansion to arrive at a net figure for infrastructure investment. However, it is crucially important to determine which cities and airports should benefit in which manner from the global pool of spending. Further, there is endogeneity in the process: decisions made on airports today will influence the airline route maps of the future; equally, the expected airline route maps should, by rights, determine the distribution of today's investment.

With 130 airports in the country and many more envisaged, it is specious to map out an investment plan for each. As a mirror to the point made here, these airport-specific plans should be dynamic in their response to changing traffic patterns and demand, and yet proactive, by building airport capacity in advance of the period when constraints start to bite. It is a difficult but essential balance, and one that will require substantial skill and strength of expert judgment.

That said, a rebalancing of traffic shares away from the metro airports is anticipated. At present, these airports process around 70 per cent of passenger traffic. With the rise of low-cost airlines, a preference for point-to-point travel whenever possible, a strategy that emphasises regional aviation, congestion at major airports and the general economic rise of the hinterland towns, the metro airports can be expected to yield traffic share to other major and non-major airports. These metro airports will remain systemically important, however, both as international gate-

ways to the country, as national hubs for both fullservice and low-cost carriers.

There is an urgent need to build airport capacity to process cargo. Congestion and delays in air cargo terminals in some of the major metro airports have become chronic. The limitations spring from several sources: limited apron space for freighter aircraft, mixing of passenger luggage and cargo, delays in customs processing and clearances, poor connectivity with the road network delaying removal of cargo from airport facilities, and so forth.

At the larger airports, capacity can be done through dedicated cargo terminals with land-side facilities let out to freight forwarders and logistics providers. Consideration should also be given to building airports that are entirely dedicated to freight. These may be public airports sited at locations that have other excellent transport facilities or are proximate to metropolitan cities and other final destinations for cargo. These may also be private airports that are operated by a provider of logistics services. For example, two of the biggest package delivery services in the world, FedEx and UPS, each maintain dedicated hubs for their US operations at Memphis and Louisville respectively. Located centrally, the firms have built massive cargo processing facilities at these airports, to allow goods to be trans-shipped to their final locations. In India, locations like Nagpur or Pune could prove to be good choices on account of their geographic centrality, thereby minimising travel times to most metro cities in India.

Cargo that is air-freighted tends to be time-sensitive, relatively low in volume, and relatively high in val-

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Table 3.16 Forecast of Passenger Throughput, Decomposition by Type of Airport

AIRPORTS (MPPA)				
PHASE	METRO	OTHER MAJOR	NON-METRO	TOTAL
2015-16	165	43	42	250
2020-21	276	77	7	425
2025-26	444	125	124	693
2030-31	695	210	199	1,104

Source: Ministry of Civil Aviation.

ue. Effort should be devoted to studying the decomposition of air freight in greater detail, and a database built of origins, destinations, and the nature and value of shipments. This will provide valuable information on the candidate sites for dedicated cargo facilities.

Table 3.17 presents estimates of the required investment in airport infrastructure to process cargo. Required capacities are calculated on the basis of a 30 per cent premium on the estimated cargo throughput over the next 20 years. Further, it is assumed that the unit cost of installing capacity to process an additional 1 million metric tonnes (mmt) of cargo is Rs 4.17 billion.

Combining the estimates presented in Table 3.15 and Table 3.17 yields a net required investment for passenger and cargo processing at airports of about Rs 6 trillion.

#### AIR NAVIGATION SERVICES

The Air Navigation Services (ANS) unit of the AAI operates communication, navigation, surveillance and traffic management systems for aircraft operating in Indian airspace. The ANS controls all air movements over India's sovereign airspace, and develops and maintains critical infrastructure and flight path systems throughout India. At airports, it manages air traffic control towers and radar centres.

In keeping with its land area, India has one of the largest sovereign airspaces in the world, and one that is projected to become even busier as domestic and international traffic in India expands. Being at the

geographical crossroads of Europe and the Middle East on the one hand, and East Asia and Australasia on the other, the ANS also assume responsibility for the through traffic over India's airspace. This traffic, too, will grow substantially in the years to come.

Substantial investment will be required to ensure that the ANS can continue to deliver on an exceptional record of aviation safety. Already busy airspace over metropolitan cities will become even more crowded, and new technologies will have to evolve to allow faster processing to and from the terminal gate. This will mean a closer separation between landings and departures, and more sophisticated methods for managing traffic in the airspace proximate to airports.

The Indian air navigation system master plan includes significant investment in modernisation communication, navigation, and surveillance (CNS) equipment, and air traffic management and meteorological equipment. It also foreshadows required upgrades in the number and expertise of air traffic controllers and other skilled staff. A series of new technologies will be required to provide centralised control over air traffic, as well as allowing some dynamic variation in flight path. (These measures may also result in reduced time and fuel burn on many routes, as the commander of an aircraft can restrictively amend the flight path to best suit circumstances.) A new navigation system, the GPS-aided GEO-augmented Navigation system (GAGAN) has been developed by the AAI with the support of the Indian Space Research Organisation (ISRO). The AAI estimates the project will require a total investment of Rs 7 bil-

Table 3.17
Investment Requirement in India for Airport-Related Infrastructure by 2031-32 (Cargo Processing Services)

PLAN PERIOD	PLAN PERIOD END- ING AT FINANCIAL YEAR	TOTAL CARGO THROUGHPUT FORECASTED (MILLION TONNES)	ESTIMATED CAPAC- ITY REQUIREMENT AT AIRPORTS (MILLION TONNES)	ADDITIONAL CA- PACITY REQUIRED AT AIRPORTS (MILLION TONNES)	INVESTMENT REQUIRED ( RS BILLION)
11 <sup>th</sup> Five Year Plan	2011-12	2.4	3.1	0.7	3
12 <sup>th</sup> Five Year Plan	2016-17	4.3	5.6	2.5	10
13 <sup>th</sup> Five Year Plan	2021-22	7.4	9.6	4.8	20
14 <sup>th</sup> Five Year Plan	2026-27	12.0	15.6	8.5	35
15 <sup>th</sup> Five Year Plan	2031-32	18.0	23.4	12.6	52
Total				28.9	121

Source: NTDPC Research

lion during the  $12^{\text{th}}$  Plan period. More generally, industry sources suggest that the investment required for ANS alone would be around Rs 37 billion for the next five years.

#### **AIRLINES**

The investment in aircraft will largely be undertaken by the private sector, though from a public regulatory perspective, the methods of finance chosen to fund these purchases will remain important. These are discussed in later in the chapter. Airbus, the aircraft manufacturing conglomerate, has prepared an estimate of the number of aircraft that will be required over the next 20 years (see Table 3.18). This includes those purchased to add capacity, and those purchased to replace existing aircraft. India can expect to add in excess of 1,000 commercial and 1,000 general aviation aircraft to its national fleet over the next 20 years.

# **GENERAL AVIATION**

The General Aviation (GA) market in India is expected to grow at 10 per cent per annum to cross Rs 16 billion by 2016-17. Industry sources indicate that around 300 business jets, 300 small aircrafts and 250 helicopters will be added to the current fleet by this time. A total investment of more than Rs 200 billion in GA facilities is required during the next five years alone.

The development of heliports is important to support the growth of general aviation in India, especially in areas that cannot have runways for financial or terrain-related challenges. A PPP policy for the development of heliports needs to be formulated, and one that especially applies to remote area service. There is also a need to develop standardised route operating procedures for helicopters.

The supporting infrastructure for GA at airports in Tier-II and Tier-III cities requires development. This includes night-landing facilities, enhancement of passenger amenities and State support in statutory services (e.g., security) to boost the GA industry. GA facilities at metro airports may be better served by developing separate terminals with premium facilities, and others that are fit-for-purpose.

Non-operational airstrips should be upgraded in places of economic significance such as ports, mining areas, tourist places and industrial clusters. These should be done at the lowest possible cost without compromising on safety. The airstrip may attract a small number of GA flights initially and if it has a strong business case, it may ultimately lead to full-scale operations in future, with significant benefits to the local economy.

With the current traffic load of scheduled flights at metro airports, GA aircraft, at times, are allocated lower priority as compared to scheduled opera-

Table 3.18 Investment in Aircraft to 2031-32

TYPE OF AIRCRAFT	FORECASTED NUMBERS OF AIRCRAFT	VALUE US \$ (BILLIONS)	VALUE IN RS (BILLIONS)
Passenger (>=100 seats)	1,019	141	7,070
Freighter (Payload > 10 Tonnes)	218	110	5,500
Sub-total	1,237	251	12,570
General Aviation (Only up to 2020)	1,400	8	410
Total	2,637	259	12,980

Source: Airbus, CAPA

tors. Delays in take-off and landing clearances may defeat the purpose of investments in GA aircraft. A joint review committee should be formed by MoCA and DGCA with representation from GA operators to review the existing regulatory and operational framework.

#### MAINTENANCE, REPAIR AND OVERHAUL

The Indian MRO industry is expected to triple in size from Rs 22 billion in 2010 to Rs 70 billion by 2020. However, this future size is small when compared with the present MRO industry size of countries such as the UAE (Rs 80 billion per annum) and China (Rs 100 billion per annum). With India likely to become the third largest aviation market, there is substantial reason to promote an MRO industry that is even larger than the Rs 70 billion envisaged. It is possible that, even at this size, the industry will not be large enough to accommodate MRO operations for India's expected fleet, forcing operators to despatch aircraft offshore for this purpose, much as they do today. India has strong comparative advantages to become a worldleading centre for MRO. These include a growing domestic fleet, location advantages, and the availability of a large skilled workforce. The challenges against this are in ensuring that the industry is regulated properly, and that the required skills are developed to service increasingly sophisticated aircraft.

To pave the road for India as a preferred global hub for MRO, it bears thinking carefully as to why it is not already so in light of the comparative advantages just noted. First, under the present set of taxation policies, Indian MRO service providers pay nearly 40 per cent more in taxes than their foreign competitors<sup>47</sup>. These are in terms of countervailing import duties, value-added and service taxes. This has led to Indian carriers taking their aircraft to other locations like Dubai, Singapore, and Malaysia for the cheaper MRO service available there, even after the transaction costs are factored in. The resultant tax revenues in India from MRO are a fraction of what they could have been. There is a need for urgent review of this taxation policy to make it consistent with international practices. The current policies place Indian airlines at a cost disadvantage, as foreign airlines are able to make use of cheaper MRO services at their home bases.

The high countervailing duties on spare parts also need to be reviewed to bring them in line with the practice at other MRO hubs. These duties prevent local MRO providers from maintaining an inventory of key spare parts, leading to wasteful delays as aircraft are grounded for long periods. The 2013-14 budget of the central government went some way in this regard. First, the time period for the consumption or installation of parts and testing equipments imported for MRO purposes was extended from three months to one year. Second, a broader class of parts

47. NTDPC (2012, p. 77).

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Airlines should be encouraged to set up MRO hubs through three-way joint ventures with MRO service providers and airports. This assures a symbiotic relationship between the three most important entities in the industry.

and testing equipment was made exempt from basic customs duty. The rationale for continued imposition of countervailing duties appears weak when considering that their sustained application over the years has hardly resulted in a vibrant domestic aeronautics industry. Meanwhile, with aircraft often deployed on both domestic as well as on international routes, and the policy goal noted previously of attracting foreign-registered aircraft to Indian MRO service centres, a re-consideration of service taxes and duties on imported parts is necessary to properly account for MRO service exports.

Airlines should be offered incentives to set up dedicated MRO hubs in India through three-way joint ventures with MRO service providers and airport companies. This assures sustained business for the venture, a cost advantage for the airlines, and a symbiotic relationship between the three most important entities in the aviation industry. Many global airlines have set up their own engineering services to which other airlines outsource maintenance. Air India's engineering arm is well-regarded, and with investment in training and equipment and a sound supporting policy, it can become a regionally important MRO provider in short time. These incentives may take the form of government designating a few airports as MRO hubs while also stipulating that all planned development at these locations properly allocates suitable on-site land and hangar facilities for MRO activities, with charges regulated by AERA. Further, AERA's remit may be expanded to regulate tri-partite arrangements between airport, airline and MRO provider and the tariffs charged for services rendered.

According to industry participants, receiving approvals for the establishment of MRO service provision is extremely challenging. Currently, the licensed activity is 'ground-handling' rather than MRO which suggests that no distinction is made between these very different services. Urgent repairs of grounded aircraft may require foreign specialists at short notice, but the issuance of the necessary security clearances is cumbersome and time-consuming. This renders them ineffective since the opportunity cost of a grounded aircraft is extremely high. There is a need to streamline clearance procedures so that there is a rational balance between business exigencies and security considerations.

In summary, the anticipated growth in Indian civil aviation, the country's geographic advantages and

the potential of a skilled labour force combine to offer a persuasive case for the setting up of regionally dominant MRO facilities. The enabling policies required are (a) reconsideration with a view towards reduction or elimination of customs duties and other taxes; (b) mandated provision of suitable facilities as airports are re-developed together with a regulated tariff regime for real estate and for provision of services at airports; and (c) policy support to equip a skilled labour force.

# **GROUND HANDLING**

A huge variety of activities are clubbed under the generic term 'ground handling'. Airlines can choose to undertake some or all of these themselves, contracting out the remainder to dedicated providers of ground handling services. Airlines will often undertake their own handling services at their hub airports; the economies of scale being such that the provision of services at other airports will be contracted to specialist providers or other airlines. These services can include arranging for passenger check-in and baggage handling, aircraft servicing at turnaround, refuelling, and in-flight catering amongst others.

The market for these services is expected to double from the present Rs 20 billion to Rs 39 billion within the next five years. A number of global ground-handling service providers have aggressive expansion plans in India. Future infrastructure development in this space will be largely driven by technology. Among the technologies expected to have a significant impact on the Indian aviation sector are passenger self-service solutions (such as for check-in), radio frequency identification for faster and more reliable processing of baggage, common use terminal equipment, unit load device scanners for cargo handling, and internet and mobile technologies. The introduction of these technologies will depend significantly on supportive fiscal policies and requisite traffic at the airports to warrant their use. Again, with handling equipment deployed for service provision on both domestic and international routes, a strong case for removing or reducing customs duties may be made.

The Ministry of Civil Aviation has brought in a ground handling policy for the six metro airports, limiting the number of ground handling agencies therein in order to facilitate consolidation and promote efficiency<sup>48</sup>. Mechanisation and modern ground handling processes are also key to ensuring efficiency. There should be proper monitoring mechanisms to oversee and enforce service level agreements between airlines and ground handling agencies, and between custodians, airport operators and ground handling agencies. To this end, airport regulators should specify service standards on the speeds with which passenger check-ins are processed, and the

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<sup>48.</sup> This has been contested by airlines. The matter is currently subjudice in the Supreme Court.

numbers of mishandled baggage, and then require service providers to file regular compliance updates and be subject to period procedural audits.

# **DEVELOPMENT AND MANAGEMENT OF** AIRPORTS: SELECT ISSUES

# **INSTITUTIONAL CHANGE**

In India, the AERA was inaugurated during a round of reforms in 2007, with the express purpose of regulating tariffs set by the new joint-venture airports and those under the direct control of the AAI. The AERA regulates a wide range of tariffs relating to the operation of aviation services including landing charges, passenger service charges or user development fees, cargo charges, parking and hangar charges. Airports can also collect revenue from nonaeronautical activities such as aviation fuel and oil concessions, restaurants and catering services, car parking, and other commercial activities such as leases to express cargo and freight forwarding companies. Revenues from non-aeronautical activities sometimes subsidise those that are directly related to aviation.

The JV airports can be considered a success on several levels. There has been rapid expansion in capacity and improvements in quality of service delivery. On the whole, these airports are not just fit-for-purpose but are comparable with the very highest international benchmarks on several fronts. However, these improvements have been achieved at a price that may be considered untenable. Landing and usage fees at Delhi and Mumbai airport are amongst the highest in the world, though these have been approved by AERA49. Airlines have periodically complained of these fees, and have cited them as major barriers to increased service provision and lower airfares. The outcry has been vociferous enough that some airlines have claimed that it is uneconomical for them to operate service to these airports entirely<sup>50</sup>. The increases in fees sought by airport operators have been large, ranging between 100 and 400 per cent, again provoking concern from users. An important contributing factor to the large increases which have created adjustment costs for end users has been that tariffs were held steady from 2001 onwards, necessitating larger revisions. Several other airports are currently following or will shortly follow a PPP-JV investment model for constructing new facilities or upgrading existing ones. It is hoped that future adjustments will be more timely, and transparently presented with a more detailed assessment of airport costs.

The JV airports will need to be careful to levy reasonable tariffs that are competitive with other airports in the region. Any attempt to levy high tariffs by the JV airports, which, it will be recalled, are the systemically important airports in the Indian aviation network, are not conducive to the desired expansion

of the industry or to lower airfares. It is fair that the development of these airports be paid for with substantial user charges. However, the current system of large increases in end-user charges on the basis of higher-thananticipated development or other costs which the regulator has little power to reject lest this force the venture into bankruptcy

Airport regulators should specify service standards like speed of check-in, and then require service providers to file regular compliance updates.

is untenable. To prevent this, future PPP-JV agreements must be subject to more careful scrutiny on development costs, with reduced tolerances for budget overruns. India's preferred model of maximal regulation of airport tariffs through AERA on the basis of cost-plus pricing is sound only if the authority has real powers to impose penalties on contracting parties to the JV for failures to hold costs in check. To this end, the permissible structure for charges should be made known at the time of the tender, so that the consortium bids accordingly and the appropriate level of investment is expended on the airport development project. This can only be achieved if there is the framework of a National Master Plan for the development of airports which identifies clear economic reasons for building new airports in generally specified locations.

Nonetheless, private funding and management of airport operations is increasingly the international norm, and it is desirable that the Centre should progressively withdraw from airport operations where feasible and commercially sustainable. If anything, state governments should play a much more active role in the airport sector since aviation is a key enabler of local economic development and they would be the appropriate partners for investors. Therefore, MoCA should engage with and encourage the states regarding the potential benefits of establishing a more conducive environment for the aviation sector based upon their understanding of the significant economic benefits of airports on their local economies.

With respect to other airports run by the AAI, the government should clarify the future role of the agency. As a first step, the AAI should be separated into two distinct functions: Airport Operations and Air Navigation Services. Each function should initially be corporatised, preparing its own financial statements, continuing under State ownership but

See IATA (2012) and IATA Submission to AERA on Consultation Paper 32/2011-12, dated March 2012 for a detailed review of the airline industry's position on these charges. See http://goo.gl/PH9IO4 and http://goo.gl/IW903M (accessed on 31 August 2013)

The AAI should be separated into two distinct functions: Airport Operations and Air Navigation Services. Each function should be corporatised, preparing its own financial statements, and managed independently along commercial lines.

managed independently along commercial lines. The Airport<sup>51</sup> Operations Division currently has no clear commercial goals and is involved in a large number of projects, of which many are economically unviable. There would be advantages to breaking these activities into smaller units, separating airport construction from airport management, in turn further breaking these down by region. Further, budget accountability is essential, considering that as the AAI enhances its prime assets and progressively privatises them, it will be left with the task of continuing to invest in airports that are initially not viable. It is also possible for the public sector authority or corporatised entity to act as a landlord while terminal operations are run by private entities.

The newly reorganised Airports Authority should then turn its attention to developing new airports together with state governments so as to stimulate their participation in the sector. However, new airport projects should be subject to review by an independent Airports Approval Committee. Such new projects should also be developed within the context of a 30- to 50-year Master Plan for Indian Airports as mentioned above, integrated with the National Transport Plan and metropolitan road and mass transit projects.

At present, the AAI's business model is highly complex as it manages the largest portfolio of airports in the world under a single operator and, in addition to the management and construction of airports, it also has the onerous task of providing air navigation services. It is for this reason that our recommendation is for a clear structural and commercial reorientation of the authority with a rolling programme of privatisation of the new assets that it creates.

#### **SLOT MANAGEMENT**

For the purposes of providing fair access to a capacity-constrained airport, 'slots' permitting planned operations are allocated to the airlines seeking to use the airport. For the purpose of slot allocation, airports are categorised according to the following levels of congestion<sup>52</sup>:

 Level 1: where the capacity of the airport infrastructure is generally adequate to meet the demands of the airport users at all times.

- Level 2: where there is potential for some periods of the day, week or season which can be resolved by voluntary cooperation between airlines.
- Level 3: where capacity is constrained due to lack of sufficient infrastructure.

Major revisions to India's slot allocation policy were introduced in 2007, and again in May 2013. The 2007 revisions were prompted by a need to accommodate the differential requirements of the joint-venture airports. The managers of these airports received proposed schedules either directly (from domestic airlines), or via Air India (for foreign airlines, highlighting an immediate conflict of interest). The airport managers would then liaise with the AAI in its role as the provider of air-traffic control and navigation services to determine runway capacities and usage, before communicating outcomes to the airlines. Slot allocation at all other airports remained under the purview of the AAI.

The newly-issued 2013 guidelines aim at correcting some of the shortcomings of the system which include<sup>53</sup>: (a) the absence of a system for objectively assessing the available slots at an airport; (b) the absence of information on available slots in the public domain; (c) no mechanism to cancel slots; (d) the blocking of slots by airlines without using them; and (e) the absence of robust appellate mechanisms. The revised policy introduced in May 2013 is intended to be transparent, fair, equitable, and amenable to course correction. To this end, it identifies streamlined procedures for assessing demand and managing capacity at airports, simplifying the process of categorisation of airports as Level 1, 2 and 3 facilities. It also sets up a coordination mechanism wherein the airport operator liaises with airlines and sets up a coordinator to allocate slots in a 'neutral, transparent, and non-discriminatory manner'. The major prioritisation principle for slot allocation is historicity in that an airline seeking slots for a forthcoming period must have used more than 80 per cent of the slots allocated to it in the previous period.

The 2013 guidelines also go some way towards ensuring that allocation considerations account for the entry of new airlines into the market, the promotion of domestic and international hubs, the promotion of season-long and year-round operations, the promotion of market competition, and ameliorating the impact of curfews at one airport on the civil aviation network. The guidelines also give the coordinating authorities more precise criteria for gauging slot misuse and powers to cancel allocated slots. As such, these guidelines are a welcome reform.

However, problems remain. Today, as per IATA principles, an incumbent airline in India is entitled to retain a group of slots based on historical precedent

<sup>51.</sup> In this context, 'operations' refers to the collective of all activities required to arrive at and depart an airport.

<sup>52.</sup> See MoCA (2013a, 2013b).

<sup>53.</sup> Ibid. (p. 7).

provided the slots in question have been allocated to a passenger air carrier and utilised at least 80 per cent of the time in the preceding season<sup>54</sup>. The guidelines additionally state that slots may not be withdrawn from existing carriers in order to accommodate new market entrants; rather, from a given pool of available slots, new entrants have access to only 50 per cent of these. At present, while the UK and European Union recognise and apply IATA slot allocation guidelines, the US does not, in part due to concerns regarding anti-trust law.

Not surprisingly, these slot allocation rules create artificial barriers to entry for new market participants by sharply limiting the number of free slots available to them at domestic Indian airports. IATA's grandfathering provision, to which the AAI adheres, allows existing carriers to withhold prime-time slots at airports on lucrative, popular routes, thus enabling incumbent airlines to cling to substantial market share and effectively crowd potential entry out of the market. Carriers also automatically control all slots utilised at least 80 per cent in a particular assignment season during the next season, and underutilised slots are only brought to market every six months, creating a time lag that compounds new market entrants' competitive disadvantage. Moreover, it is often the case that underutilised slots are intrinsically less desirable in the first place—at unfavourable times and otherwise unable to generate high revenues—which compounds new carriers' ability to compete on lucrative high-margin routes.

Another power imbalance resulting from India's slot allocation system occurs when domestic airlines merge. When two incumbent carriers merge, all premerger slots of both airlines will be allocated to the surviving entity. Since the number of slots that a carrier controls is positively correlated with the market power it enjoys, merged entities consequently end up in a disproportionately favourable position from which to capture greater market share from competitors. Not only does this process create an artificial scarcity of (already-scarce, in many cases) slots, so too does it raise the concern that sector consolidation will by default severely reduce competition in the domestic market, particularly if two larger industry players were to merge and thus effectively crowd out other incumbent carriers and potential new entrants alike. Here again, only if the merged entity fails to utilise individual slots are those slots returned to the 'unallocated' pool—a pool comprised primarily of non-peak, oddly-timed slots.

Unfortunately, the overall effect of the 2013 guidelines is unlikely to be conducive to a well-functioning and competitive sector. A case in point is the trading of slots among airlines, a process that is permitted as per IATA guidelines but banned within the Indian regulatory framework. It has been demonstrated globally that allowing airlines to trade slots can promote operational efficiency among carriers and maximise the utilisation of available slots. Indeed, slot trading (with financial incentives) is permitted in the UK, the European Union and the US and allows airlines in these jurisdictions to enhance overall sector efficiency by effectively creating a market in which slots can be allocated to airlines based on willingness to pay.

Having said this, the slot trading system is by no means perfect: for example, it can lead to hoarding, since there is generally a positive correlation between controlled slots at a carrier's influence within a particular market. However, on balance, allowing Indian carriers to trade a limited supply of slots would lead to more efficient outcomes versus the existing semi-

It has been demonstrated globally that letting airlines trade slots—not allowed in India—can promote operational efficiency among carriers and maximise the utilisation of available slots.

annual government slot review and assignment, particularly in light of the other regulatory challenges to effective competition that have been highlighted above. Greater adherence to due process, transparent decision making by airport operators and regulators will lead to continued improvements in the slot management process. Reviewing and gradually revising India's current slot allocation system will help to reduce a key market barrier to competition and in turn create a framework of more predictable and efficient slot allocation outcomes, as it has in other markets globally.

# LAND ACQUISITION AND LAND USE FOR AIR-PORT DEVELOPMENT

Unlike for other transport modes, the provision of aviation services does not depend on transport corridors. Instead, what is required are reasonably sizable pieces of land in close proximity to centres of population that also conform with international standards for safety in civil aviation. Wherever possible, it should be preferable to develop brownfield airports: these will offer the greatest locational advantages. Where it is desirable to develop greenfield airports, the area required for airport development should be decided based on current and future demand and traffic patterns.

The long-term traffic forecasts indicate that the growth of our new metro cities will require second and in some cases third airports in the 20- to 30-year timeframe. Land scarcity implies that this will not only become a significant political issue but requires search for the land for second and third airports to

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<sup>54.</sup> NTDPC (2012, p. 106) (citing IATA regulations). Note that in a year, there are two seasons (six months each) for slot utilisation; slots used less than 80 per cent of the time in a given season are categorised as 'underutilised'. See Procedure Manual Directorate of Regulations & Information, Government of India Office of the Director General of Civil Aviation, p. 10.

commence now with appropriate zoning for such land and reservation of such land for connecting transport corridors.

A strong regulatory framework is essential to determine the practices under which land can be acquired, the compensations paid, and the zoning of both the actual land used for airport development and that in its immediate vicinity. In many countries, land that is proximate to airports has been put to extremely productive use in the form of off-site cargo processing and shipping facilities, as warehousing space for time-sensitive cargo, and as real estate for the several industries that both rely on and support civil aviation. With many global cities boasting multiple airports, urban development master plans and plans for development of civil aviation should both give formal consideration to

**Urban Master Plans** should give formal consideration to a handful of smaller airports in the largest metropolitan cities.

a handful of smaller airports in the largest metropolitan cities.

An 'Airport Approval Commission' may established within MoCA to review the business plans of proposed airports prior to granting clearance55. The Commission would take account

of airport development within the multi-modal context of transport development policy: it would consider airport development with regard to sustainable viability: it would refer to goals and objectives defined for airport in that location and, in order to attract private and PPP models, the transparent and equitable economic regulatory framework needs to be articulated in advance.

# **HUB AIRPORTS**

In recent times, the government has declared the intention of revitalising Delhi's, and possibly Mumbai's airport, as international hubs. These ambitions are commensurate with India's expanding aviation market, and a desire to direct a greater share of aviation business originating both domestically as well as internationally to Indian economic and tax jurisdiction. However, as noted previously, these ambitions for global hubs that rival Dubai to the West and Singapore to the East, should be subservient to the pressing requirement for the development of national hubs within India, which help to transfer passengers from one part of the country to another more cost effectively than through point-to-point services. These West Asian and South East Asian hubs have. to some extent, developed because of the absence of similar-sized and efficient hubs in India.

While it seems a strategic national imperative that India should have an international hub to inter-

change the travellers overflying India in the global east to west and west to east air corridors, it must be appreciated that a hub in India can only operate competitively against the West Asian and South East Asian hubs, if it has a strong national airline (or airlines) to patronise this hub in preference to hubs promoted elsewhere by national governments for the airlines of their respective countries. Had Air India grown into an airline of scale, with significant international reach both eastwards and westwards to all five continents and, were it to be a viable airline, Delhi may evolved naturally to be a major airport hub for long-distance international travel to and through India. Unfortunately, Air India's current network and market share do not accommodate this vision and its future viability is in doubt.

It has been estimated that there are at least 30 destinations from India to Europe, North America and South East Asia that could justify daily nonstop flights departing India, in some cases multiple flights per destination. Therefore, as it is in the national interest for Indian-owned airlines to gain the revenue of long-distance travel of Indiaoriginating traffic, it would be necessary to actively support the development of such a full-service international airline or airlines, by providing the appropriate facilities at Delhi airport, support on bilateral rights, and other required government approvals, each according to a transparent regulatory framework. In summary, discussions on the development of international hubs in India must first recognise the more urgent requirements for promoting domestic hubs, and also ensure that a viable airline with sufficient reach exists to symbiotically develop the international hub.

Air India continues to possess the slots and air traffic rights that could, potentially, enable it to emerge as a dominant Indian airline that can be counted among the best in the world. That such an outcome is beyond any current expectation is obvious. It is therefore imperative that the government takes a considered view in this matter and reinvent Air India with the ambition of making it into a competitive airline comparable with peers such as Emirates, Singapore Airlines, Qatar Airways, Etihad, Lufthansa and the like. All of these airlines are under public ownership but are run completely on commercial lines. An imaginative solution will have to be found that takes a complete break from the past. Within India, very competitive commercially aggressive entities have appeared from former public ownership, such as ICICI Bank, and others. The solution may be to develop a completely new airline that takes over key Air India assets, while the liabilities are hived off, to be dealt with separately, analogous to a good bank/ bad bank strategy. The new airline could be in the public sector (if so desired), joint sector, or private. But the

55. CAPA's submission on the New Civil Aviation Policy

important ingredient would be complete commercial and operational autonomy.

# **ISSUES RELATING TO REGULATION OF**

# THE AIRLINE MARKET

The government seeks to take a number of measures to prevent airlines from engaging in anti-competitive practices. One such practice common among incumbent players is to charge fares on routes at levels that are in aggregate insufficient to cover marginal costs. Airlines sometimes do this to undercut relatively inefficient competitors, or to deter the potential entry of new market players by deciding to take short-term losses, something that new market entrants may not have the balance sheet strength to do. Another such strategy is for airlines to add excessive capacity or frequent service, the deployment of which can force competitors to drop fares in order to ensure greater utilisation of their own aircraft. Here again, an incumbent airline can pressure new players effectively out of the market, by lowering fares in the short term.

Needless to say, the behaviours and institutions outlined here contribute to the power imbalance among India's new and emerging airlines that is discussed throughout this report.

#### PRICING STRATEGY

A number of market developments surrounding scheduled carriers' pricing mechanisms suggest the need for some form of pricing regulation. Most recently, in 2010, there were allegations that domestic carriers were setting prices artificially high, particularly during festival and holiday seasons and during periods in which airline employees were on strike. According to the Civil Aviation Working Group Report, evidence suggests that day-ofdeparture spot prices on certain routes were sometimes seven to eight times higher than the prices airlines had been charging only weeks previously.

Although it is common in other jurisdictions—around Thanksgiving or Christmas in the United States or Chinese New Year throughout East Asia, for example—to charge higher prices during holiday seasons, the differential by which Indian domestic carriers are alleged to have done so is notable. Moreover, a number of passengers filed complaints related to excessive pricing during peak festival seasons (e.g., Diwali) during which some airlines' pilots were striking, which thus naturally gave undue advantage to carriers whose pilots were not striking, allowing them to drive up prices even as they captured excess market demand. Preying on customers whose options are limited, particularly during periods in which domestic demand is high, is problematic.

A new airline could take over key Air India assets, while the liabilities are hived off, to be dealt with separately, analogous to a good bank/bad bank strategy. The airline could be in the public, joint, or private sector. But it must have commercial and operational autonomy.

Following these episodes, the Directorate General of Civil Aviation required that carriers become more transparent in disclosing airfares in advance to the public. Going forward, regulators should work with airlines to regulate pricing, but only loosely. The desired regulatory framework should protect consumers against episodes of predatory and discriminatory pricing as described above while simultaneously ensuring that prices are fair, reasonable and largely market-driven.

One of the key factors in determining airlines' financial outlay lies in effective utilisation of aircraft, which can have a dramatic impact upon carriers' ability to efficiently manage costs. Higher aircraft utilisation rates allow airlines to reduce overall operating costs and to rationalise capacity induction in the most financially viable manner.

Not surprisingly, within the domestic market, low-cost carriers (e.g., IndiGo and SpiceJet) are more effective than full-service carriers in aircraft capacity utilisation, in part because they tend to lease rather than own their aircraft and are thus able to respond more quickly to changing demand. According to the Civil Aviation Working Group Report, in 2010-11 SpiceJet (10.6) and IndiGo (10.2) posted aircraft utilisation rates (in block hours/ day) closer to those of global industry leaders such as Singapore Airlines (11.7) than to domestic full-service peers (e.g., Jet Airways 9.7; and Air India 6.9)<sup>56</sup>.

# PROFITABILITY AND VIABILITY

CAPA estimates that India's airlines would posted a combined loss of approximately \$1.65 billion for the 12 months ending March 31, 2013<sup>57</sup>. These losses stem from two carriers—Air India (\$950 million loss) and Kingfisher (\$500-520 million loss). Other airlines, except IndiGo, which fared well, made modest profits<sup>58</sup>.

Generally speaking, Air India has struggled throughout the Indian aviation market's transition from a monopoly market into one that is increasingly competitive. Although the flagship carrier was able to break even or limit operating losses until 2005-06, the entry of four additional airlines in that year has contributed to rising losses at Air India in the period since then. Simply, Air India continues to struggle to improve efficiency and keep pace with its more innovative and agile private competitors.

Air India's performance somewhat improved in 2012-13. The net losses came down, due to increase in load factor from 67.9 in 2011-12 to 72.4. The yield (Revenue/Passenger Km) improved by 16 per cent. The financial restructuring

NTDPC (2012, p. 93) (citing Directorate General of Civil Aviation and airline annual reports).

CAPA India Aviation Outlook 2012/13

Though Kingfisher has ceased operations, its exit from the market is messy, and daily losses accrue to creditors

Based on air traffic forecasts, India's commercial fleet size is expected to more than double over the next decade. Airlines in India are expected to add approximately 370 aircraft (worth Rs 1.5 trillion) to their respective fleets in the next five years.

plan approved by the government should have also contributed towards improvement in the balance sheet. Air India should continue to improve yield and load factor and effect reduction of cost base. Finally, strong consideration must be given over the medium-term to the rationale for retaining a national airline. If the arguments are not tenable, then plans should be made to divest investment therein.

Simultaneously, Jet Airways continues to struggle financially: the airline's recent revenue growth has been surprisingly modest in spite of the fact that market conditions presented Jet with a prime opportunity to exploit the financial woes its two key full-service competitors (Air India and Kingfisher) have been facing. Although Jet Airways achieved growth in revenue and yield, the traffic in terms of passenger kilometres decreased in 2012-13 compared to the year before. The load factor also dipped marginally. Industry analysts believe that Jet Airways' inability to leverage the issues its main competitors have faced over the last year could signal structural weaknesses within the business. Specifically, CAPA India has stated that Jet's cost base may be too high and that without efforts to restructure controllable non-fuel costs—particularly in light of high ATF prices and a weak rupee—the airline will struggle to maintain viable operations<sup>59</sup>.

IndiGo continues to lead the domestic market in performance, though India's recent higher-cost environment and the airline's entry into international services have even pressured the financials of this rising star, by all accounts the domestic aviation industry's greatest success story in recent years. In spite of these factors, CAPA India still believes IndiGo is likely on track to record its highest annual profits to date this year, provided international operations prove successful and the airline is able to successfully navigate the current challenging cost environment. Moreover, as IndiGo continues to expand rapidly, it must place heavy emphasis upon ensuring consistently strong service levels (e.g., efficiency of service, on-time arrivals and other factors that have to date differentiated IndiGo's business strategy vis-à-vis domestic peers) across all the markets it serves. While customer satisfaction remains high, these issues will become ever more challenging as the airline continues to ramp up.

Go Air, India's smallest carrier by fleet size, continues to perform better than the majority of its much larger competitors. The carrier maintains stable operations and high customer satisfaction rates, and has managed to achieve the market's highest gross fares among low-cost carriers. A targeted and strategic network, the decision to operate routes on which the airline faces little competition and higher yields have served Go Air well. As the airline matures, continued reduction of debt levels will help to ensure future financial viability.

Finally, SpiceJet's financial performance continues to suffer, in part due the airline recently beginning to operate Q400 aircraft (a move that has yet to turn profitable) and its launch of international flights. Although these decisions may have been bettertimed in light of broader financial pressures on the domestic market, over time they may help the airline to build a more competitive cost base and improve efficiencies, if managed appropriately.

Overall, although the combined performance of these carriers is the best it has been over the last 18 months—yields continue to improve and the airlines are demonstrating capacity discipline as they continue to focus on profitability above market sharecurrent market conditions place a great deal of pressure on domestic airlines. Moreover, a number of key factors (most notably fuel prices and recent, sharp depreciation of the rupee) remain beyond the control of the airlines' management teams, who continue to struggle to find ways to tackle these issues. Cost pressures have further intensified this year, as airlines expect the announcement of still-higher airport charges and passenger fees in Mumbai, Chennai and Kolkata. In short, the combination of these factors continue to pressure domestic carriers and render their potential to deliver sustained profitability somewhat unlikely over the near term.

#### **ENHANCING PHYSICAL CAPACITY**

Physical capacity in the domestic market continues to grow steadily, with both Available Seat Kilometres (ASK) and Revenue Passenger Kilometers (RPK) moving largely in tandem since the mid-1990s: in fact, the gap between the two has increased significantly since 2005-06, indicating excess supply of capacity in relation to demand growth over the last five years. This has in part been the result of the global economic downturn—given the high degree of sensitivity of passenger air travel to broader economic conditions—and consequently it is critical that capacity continue to be enhanced over time in order to keep pace with India's economic growth over the medium-to-long term.

<sup>59.</sup> CAPA India has stated that Jet Airways must focus on three key elements to create viable operations, namely: (a) introduce strategic clarity and greater definition with respect to its low-cost subsidiaries and strategy; (b) control and rationalise non-fuel costs; and (c) focus on generating ancillary revenues, in which CAPA India believes the airline has recent begun to take positive measures.

Based on air traffic forecasts, India's commercial fleet size is expected to more than double over the next decade. Airlines in India are expected to add approximately 370 aircraft (worth Rs 1.5 trillion) to their respective fleets in the next five years<sup>60</sup>. Similarly, India's general aviation fleet is expected to expand by roughly 2,000 (aircraft and helicopters) in the next decade<sup>61</sup>.

There are various methods by which airlines can successfully induct new aircraft (e.g., direct purchases, finance and operating leases), each of which holds various degrees of benefits and liability. In India, while Air India chooses to follow the direct purchase model, low-cost carriers such as IndiGo and SpiceJet tend to lease their aircraft.

Although Air India owns its aircraft, industry analysts are concerned that the flagship carrier may not have the capacity to fully leverage domestic demand and engineer a turnaround of its recent financial and operational woes. Air India currently owns 55 domestic aircraft (only 45 of which are available purely for domestic routes)—an insufficient number with which to successfully meet domestic market demand. Similarly, Air India only has between 20 and 25 aircraft for international routes, and CAPA India further believes that its core aircraft (the Boeing 777) has not been optimally deployed with respect to route selection, further pressuring the airline's already-insufficient international fleet.

# **FUEL PRICING**

Fuel is perhaps the largest input in aviation, accounting for around 50 per cent of operating costs. Prices for ATF in India are nearly 60 per cent higher than in neighbouring hubs like Dubai, Singapore and Kuala Lumpur. The high prices result from its administrative treatment, a complex system of taxes and the lack of competition in a market where other fuels are subsidised. Representations delivered to the Working Group on Civil Aviation suggest that the market for ATF is not sufficiently competitive to ensure that prices have a direct basis in costs<sup>62</sup>. Prices of ATF are based on International Import Parity Prices and so are unrelated to the actual cost of refining ATF in India which is a middle-distilled crude derivative. Instead, the purchase price of ATF includes a notional customs duty of 5 per cent, a customs excise duty of 8.25 per cent, service taxes on refuelling activities at 10.3 per cent, value-added taxes at around 25 per cent that are levied by most states and an Octroi or entry tax.

Despite being an input fuel (similar to coal and gas), ATF is subject to VAT, ranging in most states between 20 per cent and 30 per cent. Generally, the central excise duty paid on any input in manufacture is set off against service tax paid on output as per the service tax principles laid down by the Central Board of Excise and Customs. However, this facility of set-

off is not applicable in the case of ATF although air travel itself is also subjected to service tax.

Other recommended policy changes are (a) the inclusion of ATF in the unified GST regime, as introduced in the future; (b) the existence of a more transparent ATF

Prices for ATF in India are nearly 60 per cent higher than in neighbouring hubs like Dubai, Singapore and Kuala Lumpur.

regime where oil marketing companies are required to declare costs and methods used to price the end product; and (c) a switch to a specific rate of duty rather than an ad valorem structure. The last recommendation is motivated by the fact that higher base prices result in both higher duties as well as higher VAT under the present taxation regime.

# **AIR INDIA**

The government should clarify the future role of Air India. In the present environment, reasons for government to operate an airline in a highly competitive, volatile, and capital-intensive environment must be clearly defined. The Committee has not found persuasive arguments for continued government ownership and operation of the airline. In the event that these reasons are not defined, a plan for the progressive disinvestment of the government's stake in Air India over a period of three to five years, based on a phased scheme with defined milestones should be identified. The airline will need to be recapitalised, restructured organisationally, its working capital debt burden written off and some divisions made independent and corporatised, with government retaining perhaps a 26 per cent stake. It would essentially be a new airline. As recommended earlier, this entity should start completely anew while Air India's current liabilities are separated out and dealt with.

It is apparent that with its excessive and unproductive manpower, its failure to invest in the technology required to keep it competitive and with its sub-scale operations, Air India's future prospects remain precarious. Air India must therefore be provided the opportunity to reinvent itself with new professional management, managerial and operational autonomy, while taking over all existing productive assets. If such a makeover cannot be done in a public sector or joint sector framework, it will need to be privatised. Failure to implement such a plan will

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According to the Working Group Report, studies of mature aviation markets (e.g., the US) suggest that general aviation plays a significant role in the expansion and growth of a nation's scheduled commercial market. Consequently, it is important to take note of India's future general aviation growth, as it will in part influence commercial and overall sector growth.

The aviation market still presents barriers to entry relating to political risk. Nor does it facilitate orderly exit with airlines having been allowed to continue operations when they fail to meet their payment obligations.

continue to drain over \$1 billion per annum of tax payers' money each year over the next 10 years, which is surely unacceptable in the light of our national priorities. Meanwhile, Indian civil aviation will suffer and India will not be able to develop major hubs

#### **GENERAL AVIATION**

General Aviation has the potential to emerge as the key driver of regional connectivity and with it, accelerated economic development. It is therefore surprising that this sector, which has such a massive growth potential and in many other countries has hundreds if not thousands of aircrafts being operated on a non-scheduled basis does not have a dedicated policy or regulatory framework or infrastructure or services in this country to support it.

The current neglect of the sector is a serious economic opportunity loss for the Indian economy. Plans for the development of national airports should incorporate steps to increase capacity of support to, and flexibility for, general aviation. This would include ensuring adequate parking and hangar space, allowing MRO activities on the airport, and developing ATC procedures capable of accommodating increased movements of small aircraft.

Along with this, serious consideration should be given to the development of disused or low-traffic secondary airports, where state governments could support their revival to stimulate air taxi operations for business and tourism.

The current regulations affecting general aviation impose restrictions on import of aircraft and in some cases do not recognise the difference between helicopters and fixed wing aircraft. The DGCA suffers from shortage of personnel to monitor this area whether there is a multiplicity of aircraft type and fragmentation of operations. The DGCA should establish a dedicated division to deal with general aviation through, for example, the appointment of a Director for General Aviation.

# **COMPETITIVENESS**

The present aviation market, though liberalised, still presents barriers to entry relating to political uncertainty and risk, as a result of absence of an aviation policy. Nor does it facilitate orderly exit with airlines

having been allowed to continue operations when they fail to meet their payment obligations. The regulatory authority must take into account (and have the expertise to do so) the financial strength and stability of airlines while permitting entry and also continuing operations. A similar approach for financial viability assessment should be put in place and applied to airlines in view of the very large numbers of passengers who can be stranded away from their homes, in India or abroad, by a cessation of an airline's operations. These important factors relating to airline stability must be gauged by more systematic and consistent criteria that agree with basic accounting and economic principles, rather than by arbitrary rules of thumb such as the 20-5 rule described here. The criteria and the resulting regulatory action can also include the very basic: for example, airlines should not be permitted to expand if they are encumbered with heavy debt obligations which remain unpaid; or if they have negative net worth; or if they have inadequate liquidity to meet their current operational obligations.

It is further recommended that new entrant airlines should be scrutinised for the strength of their business plans, for adequate capitalisation and that the airline at any point of time has the liquidity to meet liabilities for a defined period (such as one or two quarters) without any revenue inflow for that period. The aviation policy should also strictly prohibit the grant of no-objection certificates for the relaunch of any airline whose previous debts to banks or creditors remain unpaid. Elsewhere in the world, if an airline does not have cash to pay fuel bills, or airport charges, or navigation and landing fees, it is obliged to cease operations. If the same discipline is made to apply in India, inefficient airlines will quickly either recapitalise or exit, thus permitting entry of better capitalised entities.

# **SUSTAINABILITY AND OTHER ISSUES**

## **EMISSIONS**

Four kinds of gases make up the main emissions from aviation<sup>63</sup>. These are carbon dioxide (around 70 per cent of total emissions), water vapour (30 per cent), and miniscule proportions of nitrogen oxide and sulphur oxide. About two per cent of global carbon dioxide emissions can be attributed to aviation. Though the absolute quantities may be small relative to other transport modes, these are very large relative to passenger kilometres performed. The effects of the emissions are especially pernicious as the largest quantities of these take place at high altitudes where their warming potential is greatest.

The industry's collective efforts at reducing emissions are spearheaded by ICAO and IATA, though the European Union has perhaps made the largest

63. World Bank (2012).

efforts of any individual jurisdiction. The Group on International Aviation and Climate Change (operating under an ICAO mandate) was tasked with developing measures consistent with the UN Framework Convention on Climate Change for the aviation industry. The declarations emanating from meetings held to debate the findings of the Group argue for annual average fuel efficiency improvements of two per cent until 2020, with similar long-term goals from 2021 through 2050. The declarations also 'announced plans to create a market-based mechanism to lower emissions and a comprehensive reporting system to track emissions'64. Further, the development of alternative fuel technologies and engine efficiencies is encouraged.

Meanwhile, the European Commission's 2008 directive on extending an emissions trading scheme to aviation requires all flights operating to or from the EU to be subject to market-based measures to either reduce greenhouse gas emissions, or to compensate for them. Carriers are given allowances based on their past emissions levels, and are then set targets to reduce these by defined proportions each year. 'Carriers that exceed their allotted allowances must either purchase allowances from other ETS participants, purchase approved emissions-reduction credits, or pay a fine'65. Finally, IATA has proposed that the industry respond to these goals and regulatory requirements with a four-pronged approach. First, new technologies must be deployed to yield more efficient engines and aircraft, and better fuels. Second, operational practices like weight-reduction measures and more efficient flight procedures and air-traffic control should be researched and adopted widely. Third, better airport infrastructure (for example in terms of its siting, layout, and design) could result in reduced low-altitude emissions. Finally, market measures like carbon offset programmes, cap and trade programmes, and others should be developed and adopted.

Indian regulatory authorities have not agreed or subscribed to these goals for the most part. However, Indian carriers will not be immune to these measures even if they are not adopted domestically. Fungible technologies and the absence of a domestic manufacturing industry mean that over time, globally standard equipment will be the norm in domestic fleets. More importantly, Indian carriers will have to conform to rules imposed by regulatory authorities in foreign destinations. For example, the EU directive noted above applies to international airlines from all domiciles from 2012 onwards. Indian regulatory authorities and airlines are active and valued participants in institutions like the ICAO and IATA. By treating this as a matter of importance as they shape the growth of the sector, and by allocating greater priorities towards these concerns, they can both shape the global agenda as well as better prepare the domestic industry for changes in international standards. To that end, if domestic authorities deem objections to proposed international norms justifiable, then rigorous alternatives must be investigated and raised for discussion at the international forums. To do nothing would ignore a pressing problem and signal a substantial missed opportunity to shape the international agenda.

# **NOISE POLLUTION**

Since the rise of the jet aircraft in the 1960s, concerns have been raised about the impact of generated noise on human health. Though the science assessing this impact is not universally accepted at the margin, several less controversial links have been

proven to hold true. Sustained exposure to defined 'high' noise of around 85 decibels (dB) can cause hearing impairment in the medium to long term. Shorter exposures even higher peak sounds (in excess of 120dB) can cause immediate pain, tinnitus, and immediate and permanent hearing

Concerted global effort has made sure that modern jet engines are almost a quarter as noisy as those in the 1960s.

loss. The physiological effects of noise pollution are not limited to the ears. Noise exposure has also been pinged as a causal factor in adverse cardiovascular, immunological, and pre-natal effects. Perhaps most importantly, there is general annoyance, stress and hypertension, sleep deprivation, and irritability that stems from excess noise, each of which has consequences for workplace productivity and the general enjoyment of life.

In recognition of these effects, there has been concerted global effort over the years to ameliorate aircraft noise and its effects. The lion's share of the noise abatement has come from the aircraft themselves: modern jet engines are between a quarter and a third as noisy as their ancestors from the 1960s. Regulatory authorities have modified ATC and other practices to allow for quieter take-offs and landings. For example, the practice of Continuous Descent Arrival wherein an aircraft descends continuously from cruise altitude (typically around 35,000 feet) to a final approach altitude of 3,600 feet reduces the noise associated with step changes in altitude<sup>66</sup>. Similarly, prohibitions on the use of reverse thrusts substantially reduce noise in the immediate vicinity of the airport.

The ICAO recommends a balanced approach to limit noise from civil aircraft. The first element is a progressive tightening of noise certification standards on jet engines and airframes. These standards are published by the ICAO periodically, and referred to

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Ibid. (p. 35)

The AAI has recently permitted this practice for landings at Delhi International Airport, with a view to extending this to other airports.

by 'Chapter' numbers. The latest noise standard, Chapter 4, was agreed to by the ICAO in 2001, and features a ceiling that is 10dB lower than the previous Chapter 3 standard. It is estimated that each new generation of jet aircraft are 15 per cent quieter than the previous generation. The second approach focuses on ensuring that the population affected by aircraft noise is minimised around the airport through better land-use planning. Third, new regulations governing operational procedures can mitigate noise. These can range from outright bans and curfews to procedures governing flight paths and technical restrictions on take-off and landing practices. Finally, as with the emissions reduction methods proposed here, the fourth pillar at containing aircraft noise seeks to implement measures that directly charge airlines on the basis of noise emitted by their fleets. For example, the UK sets noise emissions quotas and also determines the contribution that an aircraft movement of a particular type makes towards using up the quota. A gross quota is allocated to airlines

The challenge lies in ensuring necessary levels of supply of skilled staff, while maintaining unimpeachable safety standards

which helps them better manage their fleet and operations to ensure that their cumulative noise emissions remain contained within the quota.

Τt is recommended that all

future airport developments be made with a view towards mitigating the impact of aviation noise on surrounding populations. This may be done by designating and allocating land far in advance of intended usage, and by permitting populations in the vicinity both the incentive and the opportunity to relocate. Further, the neighbouring land should be zoned for uses that are compatible with the aviation industry, thereby minimising the likelihood of objections to aviation-related noise. Such advance planning will also avoid the requirement of post hoc measures such as curfews which may prove detrimental to the growth of the industry. Should issues of noise become especially pertinent at a particular airport, consideration may be given to innovative schemes such as quotas that allow airlines to selfregulate total noise emissions in any manner consistent with market realities. Meanwhile, for the present, detailed observations should be made of the impact of noise at all airports on the surrounding community. Where the data suggest obvious health hazards, consideration should be given to stricter amelioration measures like insulated homes and windows and abatement measures like curfews. As the Indian aviation market expands and matures and remains profitable for the operating airlines, the 67. NTDPC (2012, p. 151).

curfews should not prove inimical to the health of the industry.

#### **HUMAN RESOURCES**

#### THE PRESENT SITUATION

India's civil aviation sector is at present facing acute shortages in manpower, e.g., for pilots, cabin crew, engineers, air traffic controllers, ground staff and handlers, administration and management. According to the Report of Working Group on Civil Aviation for formulation of 12th Five Year Plan (2012-17), the total manpower requirement of Indian carriers is estimated to rise from 62,000 in 2010-11 to 117,000 by 2016-17. This shortage is due primarily to a significant lack of adequate training infrastructure, including training academies, instructors and equipment. The staffing requirements at Indian airports can also be projected. The metropolitan airports, on average, employ one staff for every 65 passengers, while this ratio is around 200 in the smaller airports. Consequently, the Working Group estimates the total manpower requirement at airports to increase from 20,000 to as much as 30,000 by 2016-17. Even after accounting for improved efficiencies, this figure could grow fivefold over the period under consideration by this Committee.

The challenge lies in ensuring supply of skilled staff at a pace consistent with the expected and desired growth rates in civil aviation, while maintaining unimpeachable safety standards. India faces competition from regional aviation hubs, as well as from those further afield for these skilled staff. For example, between 30 and 40 per cent of the staff at several carriers and aviation service providers based in the Arab Gulf, are drawn from India<sup>67</sup>. Meanwhile, the ICAO forecasts that all regions except North America are expected to face a shortage of pilots, with the problem most severe in the Asia-Pacific region. Another independent forecast suggests that airport employees, air traffic controllers, ground handlers, catering staff, retail and security staff are estimated to triple from 90,000 at present to 270,000 within 10 vears68.

Almost no educational, research or governmental institution in the country undertakes research in civil aviation. There is also an absence of qualitative and recognised formal educational programmes in civil aviation (as opposed to engineering and aeronautics). Many public and private organisations in the field must therefore recruit generalist staff and invest considerable resources in on-the-job training. The quality of flying schools in India is not gauged to be satisfactory. Airlines and type-training organisations report serious concerns with the quality of graduating students. In the absence of sufficient high-quality domestic pilots, India continues to rely extensively on foreign pilots. Of the 42 licensed pilottraining institutes, only 17 are operational. There

is no institute for training civil helicopter pilots in the country. India has approximately 1,900 Air Traffic Controllers compared to a sanctioned strength of 2,200. There is a need to increase the capacity of current training facilities to keep pace with growth as well as to provide recurrent training to existing controllers. It is estimated that an additional 2,500 to 3,000 ATCs will be required over the next five years. Further, the existing ATCs would also require upgraded training to keep pace with the significant investments in modernising equipment and operations under the Indian Navigation System Master Plan.

Finally, in Air India's case, the resolution of personnel issues remains the national carrier's most significant structural challenge. The imminent retirement of 13 executive directors will deplete the airline's management strength at a pivotal time in the airline's life, and it is of paramount importance that Air India use the current opportunity to induct experienced industry professionals so as to create a strong management team capable of carrying the airline through this critical phase. Simultaneously, the periodic pilots' strikes have proved extremely costly to the airline's global reputation and, according to CAPA, 'virtually sealed the decision by Star Alliance not to proceed with its membership'69.

#### **IMPROVEMENT MEASURES**

At present, the Indira Gandhi Rashtriya Uran Akademi (IGRUA), the National Institute of Aviation Management & Research (NIAMAR, recently renamed the Indian Aviation Academy), and the Civil Aviation Training Colleges at Allahabad and Hyderabad airports provide education and training services in civil aviation. However, these institutions collectively offer only a small subset of the required skills for the modern industry. For example, IGRUA trains pilots to be eligible for commercial licenses, and this is the only regularly scheduled course it offers. Other courses such as on instrument rating and engine endorsement are only offered on an asneeded basis. Meanwhile, NIAMAR/IAA specialises in short courses such as on IATA guidelines on dangerous goods or on environmental and safety issues that meet the needs of the employees of DGCA, the AAI and BCAS.

These course offerings are not sufficient to meet the needs of a vibrant industry. The initiative taken by MoCA to set up the Rajiv Gandhi National Aviation University in Uttar Pradesh should be supported with full administrative and financial support. A separate division in the Ministry with a full contingent of staff and officers devoted exclusively for aviation education and training with appropriate budgetary support is also required. Second, the standards of curriculum and examination systems for various categories of personnel in the aviation sector should In the absence of sufficient high-quality domestic pilots, India continues to rely extensively on foreign pilots. Of the 42 licensed pilot-training institutes, only 17 are operational. There is no institute for training civil helicopter pilots in the country.

be completely overhauled with modernised systems of examination and evaluation. Third, the systems of accreditation of various training institutes of the aviation sector in the country by the regulator need to reviewed and restructured to ensure that the most modern systems are available with the training institutes along with adequate infrastructure for imparting training to all categories of personnel. The University should offer degree and diploma programmes in the various fields of civil aviation leading to increased professional recognition, better jobmarket signalling, and better-defined career paths in the industry.

The training and capacity building of ATCOs should be an immediate priority. Partnership options with international ATC training institutes should be explored. The enhanced capacity can also help ATC earn additional revenue in the long run by training foreign ATCOs and providing consultancy services to global ATC service providers. It is appropriate to consider the option of allowing private players to set up ATCO training facilities, subject to adequate supervision by AAI. This may be started in a PPP mode first and thereafter be made fully open to private sector in the long run.

Midcareer training to personnel who are already employed in the industry should be the next area of priority. The training of trainers should be the priority in all organisations in the sector and adequate funds should be made available for this purpose.

There are 77 DGCA-approved Aircraft Maintenance Engineer (AME) institutes producing around 5,000 engineers every year. AMEs and technicians need a minimum of a year's experience on heavy aircrafts and pass the DGCA examination to get type-rated license. Although India enjoys a significant cost advantage, it has a shortage of qualified MRO personnel who can carry out complicated repairs on the latest aircrafts and components. There is a strong case for establishing MRO training institutes to help develop capability of certified MRO engineers.

Cabin crew strength has increased from around 4,000 in 2001-02 to around 10,000 in 2008-09. The requirement would increase significantly as the fleet sizes of Indian and global carriers expand in the near future. On this front, the focus should be on setting standards expected of graduating students, and on

69. CAPA (2012)

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The FAA has periodically placed the DGCA on notice after 'safety audits showed a lack of coordination in air-worthiness and flight operations in the country'.

setting benchmarks for testable skills. On several occasions, training establishments have proven to be sub-standard or, at their worst, fraudulent enterprises. Greater vigilance is required to register and certify these institutions, and towards ongoing monitoring.

# **SAFETY AND SECURITY**

Safety is of paramount importance in air transportation. The safety levels that global air transport enjoys today represent an enormous improvement on the outcomes of earlier decades and an achievement built on the determination and efforts of all stakeholders. India has maintained an excellent safety record with only four accidents in scheduled commercial air operations over the decade to 2000. (Nonscheduled air operations account for 22 accidents in the same period.) The outcomes of these efforts must be preserved and new standards established to keep pace with the demands of increased traffic. It is forecast that the 1.3 million aircraft movements of 2010-11 will grow by about 13 per cent each year to reach a total of nearly 5 million by 2020-21 and 14 million by 2030-3170.

The major regulatory issues are as follows. First, staff shortages at the DGCA render safety oversight, regular audits, and monitoring of operations difficult. The shortages make it impossible to carry out meaningful audits, surveillance of a large number of scheduled and non-scheduled operators, training institutes for pilots and engineers, maintenance organisations, and airport service providers<sup>71</sup>. The DGCA has further responsibilities in terms of compliance with ICAO standards, the licensing of personnel, the registration and certification of aircrafts and communication systems, and the investigation of accidents that it is not able to execute satisfactorily given the staff and skill shortages. These shortages have been severe enough that the international credibility of safety standards of Indian aviation have occasionally been under threat. For example, the FAA has periodically placed the DGCA on notice after 'safety audits showed a lack of coordination in air worthiness and flight operations in the country, which pose a risk to passenger life'. Should such downgrades in the perceived reliability of the DGCA's work eventuate, it would have a massive impact on the credibility of the entire sector and impose large costs on the airlines as they seek the offshore certification that will allow them to continue operating overseas. Recruitment processes at the DGCA are constrained by standard government practices. To these ends, the Committee is able to endorse the ICAO's recommendation that the DGCA be transformed into a Civil Aviation Authority with the necessary autonomy.

Second, infrastructural limitations cause groundand air-space congestion with attendant implications for safety. As traffic increases, the reduced separation between aircraft movements and in holding patterns will create increased levels of stress for ATC staff, and increase the odds of accidents. Specifically, safer air travel can be achieved with less congestion or with practices and technologies that can better manage congestion. New ATC policies, hardware, and software will help in this regard, as will the expansion of airport facilities to include parallel runways. Instrument landing systems (ILS) that enable aircraft movements during times of reduced visibility will require pilots to be trained in the necessary procedures. Third, training of aviation personnel must be subject to accreditation and recognition of institutions and to in-depth and on-going certification of the standards achieved by graduating student, as described in the previous sub-section.

Fourth, regulatory powers must be clearly identified and delegated to allow effective enforcement of unambiguous rules. At present, the system requires the regulator to initiate legal proceedings under all circumstances. The enforcement mechanism should differentiate between the severity of an offence and delegate powers to the authority to investigate, prosecute and adjudicate over a limited range of procedural matters. Such a system is common in many countries, and indeed in India for the roads and railways. An appellate mechanism outside DGCA, preferably in the Ministry of Civil Aviation, should be available to operators to ensure fair enforcement of regulations. Beyond these considerations, the improvement of facilities for maintenance and MRO operations, and wider training in new technologies will both ensure continued safe outcomes in the sec-

In 2006, the ICAO carried out a comprehensive audit of the DGCA and identified technical manpower, training of personnel, legislation, and oversight capacity as the major areas of concern and redress. The DGCA has already made some progress in addressing these, such as by establishing a training institute for its staff in conjunction with the AAI (see above). Modernisation of the DGCA's operating practices is essential to keep pace with technical innovations in the operation of aircraft and management of airlines. For example, urgent implementation of a proposed comprehensive computerisation plan to maintain databases of pilot qualifications, tests, medical records, engineers' qualifications and air traffic control is required. That said, the institution and the desired goals may be better served by a fundamental reconsideration of its charter and powers

<sup>70.</sup> NTDPC Working Group Report on Civil Aviation, p. 137.

<sup>71.</sup> ibid, p. 148

with views formed as to whether this could be better executed if the body were to be re-incorporated as an independent third-party regulator, or as a civil aviation authority.

Aviation security is in the responsibility of BCAS which ensures that air passengers, airport and airline staff, and air cargo are all fit to undertake journeys or perform functions. As with the DGCA, the BCAS is under-staffed and must rely on a mix of state police and the CISF to actually undertake the security screenings at airports. This results in wide variation in the stringency with which the clearance protocols are applied at the various airports. The enlargement of airports, new airports, and the general rise in traffic when coupled with new and emerging threats to the security of civil aviation will place increased demands for more efficient screening from the security apparatus. A revitalised BCAS should be staffed with experts in airport design, planning, information technology, human resource management and civil intelligence.

#### AIR SERVICES IN THE NORTH EAST

As noted in the introduction to this chapter, air travel can be an expedient, financially sound, and environmentally-friendly means of providing connectivity to remote areas, and to regions of the country that present challenging terrain for expansions of the road and rail networks. This is especially important in the eight states that comprise India's North-East: Assam, Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Tripura and Sikkim. At present, air services are available to or from 11 airports in the region, with most of these being the primary airports of the state capitals. Over the past five years, flights connecting the region with other parts of India have grown consistently, but at rates slower than the general pace of aviation growth. The Summer Schedule of 2007 indicated 290 flights per week to the region; the same period in 2011 saw 370 flights; and 420 flights in 2013. In addition to scheduled air services, non-scheduled shuttle service is also provided to and within the region with small aircraft.

The primary mechanism for ensuring service to the region are the Route Dispersal Guidelines (RDGs) which require scheduled airlines to necessarily allocate capacity on these often-unprofitable routes in exchange for permissions to operate the more desirable, i.e., more heavily trafficked, routes elsewhere in the country. Thus, the social obligation of providing basic connectivity to remote areas and to promote economic development is delegated to the airlines.

RDGs are set out by MoCA with a view to achieve better regulation of air transport services and take into account the need for air transport services of different regions in the country. All routes are divided into three categories: I, II and III. Category I routes are those that traditionally generate surpluses, and form the trunk civil aviation network connecting the metropolitan cities. Category II routes connect remote areas and are considered loss-making. These include those connecting airports in the North East, Jammu and Kashmir, the Andaman and Nicobar islands, and Lakshadweep. All other routes are subsumed into the third category. Category II routes are further classified into II(A) routes referring to those that exclusively connect airports within the specified regions. Capacity deployments based on historical ASKs then determined the following RDG specification:

- On Category II routes, airlines are required to deploy at least 10 per cent of the capacities allocated to Category I routes.
- On Category II(A) routes, airlines are required to deploy at least 10 per cent of the capacities allocated to Category II routes.
- On Category III routes, airlines are required to deploy at least 50 per cent of the capacities allocated to Category I routes.

The RDGs are subject to the following additional restrictions. First, a service operated on a Category I route as a part of international air service will not be reckoned for the above purpose. Second, multiplesector flights that connect two metropolitan cities, for example, before providing onward service on a Category II or Category IIA route, capacities on the individual sectors are accounted towards RDG fulfilments. These aside, all airlines are free to operate anywhere in the country subject to compliance with the RDGs.

The major issues of concern are that the RDGs only provide a partial solution to the issue of regional productivity as even on Category II and III routes, airlines cherry-pick the routes which are comparatively more lucrative leaving the unviable sectors underserved. This internal cross-subsidisation is not sustainable in the long run given the financial stresses the airline industry is presently undergoing. There is a strong view that in order to achieve social objectives of connectivity and of economic development in these regions, more innovative mechanisms need to be introduced.

Examples of such mechanisms abound. These include direct budgetary transfers to an airline leading to a reduction in cost price of the air ticket. Alternatively, airlines can be made exempt from landing fees at remote airports reducing their costs and increasing route viability. Direct cash or voucher transfers can be made to passengers. Finally, taxes can be imposed on airlines that provide

services on financially viable routes, and then used to subsidise the unviable routes. Direct budgetary transfer can be supported through a process of minimum subsidy bidding72.

Australia offers a pertinent example of the implementation of one mechanism. It is a large country with a population that is highly concentrated in its largest cities along the Eastern coast. Then, there are dozens of smaller towns and hundreds of communities in the continent's vast hinterland, many

For essential air services on routes that are strategically important but commercially unviable, the State should provide explicit subsidy support.

of which are several days' drive from their closest neighbours. In this geographic setup, the policy goal for Australian civil aviation is to maintain an open interstate domestic aviation market that maximises benefits to the Australian economy, but also provides assistance for regional and remote air services, where many

routes remain vulnerable to low demand and high per-passenger costs. These remote routes are essential for economic and social well-being of the communities they serve and the Australian government aims to target assistance to these remote areas. The Remote Air Service Subsidy Scheme (RASS) in Australia 'subsidises a regular weekly air transport service for the carriage of passengers and goods such as educational materials, medicines, fresh foods and other urgent supplies to communities in remote and isolated areas of Australia'73. Communities apply directly to the Department of Infrastructure and Regional Development which considers the application against set criteria such as demonstrated need and sufficient 'remoteness'. Air operators are contracted with the Australian government for a fixed term and the subsidy is paid directly to the air opera-

The essential air services programme in the US and in other countries operate on similar lines and are also often based on minimum subsidy bidding. They have many features in common: they are aimed at linking small communities with larger ones, support generally comes from central budgetary allocations, mechanisms involve transparent public competitive tender or application process for carrier selection, provision of subsidies, concession or license granted is contractual and time-limited and the regulatory elements cover frequency, capacity, levels and conditions of air fares and standard of service74.

The Naresh Chandra Committee Report recommended an Essential Air Services Fund (EASF) for India as a replacement for the RDGs. 'As regards maintaining essential air services on routes that are strategically important but are commercially unviable, the government should provide explicit subsidy support, preferably through direct budgetary transfers or the imposition of a sector-specific cess or a combination of both. In addition, such support should be allocated through a transparent process of minimum subsidy bidding. Here it is noteworthy that competitive tendering of subsidy for maintaining essential air services is a well-established practice in several countries, as it allows such routes to survive but on the basis of fair competition and at the lowest cost possible to the tax payer'75.

These recommendations are a worthy replacement for the current RDG system. The EASF should be non-lapsable and exclusively aimed at providing explicit and direct subsidies to airlines to make up for viability gaps on defined routes. As noted in the section on regulation, budgetary support will be required for this fund but the ministry may also consider augmenting the fund through a cess on domestic passengers chargeable through tickets issued by airlines. The EASF could also be utilised for the development of low-cost regional airports and heliports<sup>76</sup>.

#### **FINANCE**

Insofar as transport infrastructure for aviation is concerned, in an environment in which private enterprise in providing air carriage service is encouraged, the government's major responsibility falls towards ensuring that efficient airports are available to meet demand. In recent years, the government has entered into partnerships with private entities to develop and expand airport facilities at a handful of the most important airports in the country. However, it remains responsible for the expansion of all other existing airports, and for the development of several new ones in India's smaller towns and cities77.

# **PUBLIC AND PRIVATE OWNERSHIP OF AIRPORTS**

In India, the management of all non-private airports is under the purview of the AAI<sup>78</sup>. The AAI executes its agenda with the public interest in mind rather than with profit considerations. This, however,

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In a minimum subsidy, auction, the government identifies a project and a maximum subsidy. Companies compete for the project by bidding down the value of the subsidy. The bidder requiring the lowest subsidy wins

http://www.infrastructure.gov.au/aviation/regional/rass.aspx (accessed 10 February 2014). NTDPC (2012).

MoCA (2003, p. 22)

About one-third of EASF could also be ear-marked for providing critical viability gap funding to regional airports in underserved areas. 76.

The discussion in this section is based in part on the Convention on International Civil Aviation In other countries, public ownership and control of airports can yest with state governments or municipal authorities

should not preclude the setting of clear objectives and the adoption of best commercial practices.

Some of the most important airports are developed as joint-venture partnerships between the AAI and private enterprises. For example, for Delhi and Mumbai airports, the AAI retains a 26 per cent equity stake, but is eligible for revenue shares that are as high as 46 per cent. The joint-venture model was intended to attract private capital to a sector undergoing rapid expansion in the 2000s and in dire need of investment funds. It was also envisaged that the JVs would bring a new standard of service to the sector eliminating the congestion, delays and poor customer experiences that had become the norm. Much of the airport development in the 11th Plan period was funded from these PPPs that resulted in funding that was well in excess of that allocated to the AAI.

Investment in airport infrastructure is capitalintensive with significant concomitant risk and long payback periods. Private promoters continue to bring in very low equity and thus the debt-to-equity ratios are extremely high, sometimes reaching 80:20 proportions. Such a debt-equity structure translates into fixed cash outflow in the form of huge interest repayments. Short-term debt servicing costs can be as high as 18 per cent per annum with longer-term returns to debt of around 12 per cent. This results into long payback periods to equity investors.

The revenue-sharing models noted here are a departure from the international norm. Operators of airports developed under joint ventures have expressed concerns that their commitments for 'high' revenue share could potentially affect their viability unless there are alternative sources of raising revenue to airports. Raising the level of non-aeronautical revenue is limited by the scope of activities for commercial exploitation under 'city side development'.

As noted earlier, it is fair to state that the PPP-model has delivered airport infrastructure that is internationally comparable. The infrastructure was built, largely on time, and largely on budget, even going by the usual benchmarks for these projects. Some of the key outcomes were recorded in the form of higher user satisfactions for passengers, increased focus on land use and real estate activities, better utilisation of fixed and variable assets with a focus on non-aeronautical revenue generation, and better coordination with local bodies and state governments. The entry of leading private air-cargo companies has brought in a wave of increasing automation, mechanisation and process improvement initiatives at major air-cargo terminals in the country.

On the other hand, contracts under PPP have also proved problematic, primarily because of the large

Operators of airports developed under joint ventures have expressed concerns that their commitments for 'high' revenue share could potentially affect their viability.

tariff increases that have eventuated. The contracts were awarded without a proper regulatory authority in place. Issues arising out of agreements already made prior to the introduction of a new tariff and performance regulator had to be resolved by AERA which resulted in uncertainty in the system. Projects incurred large cost overruns due to PPP infrastructure being based on very preliminary rough estimates. Mid-course corrections requiring revision in design and planned capacity were necessitated due to unprecedented upswing in the air traffic. A lack of clarity as regards accountability of PPP entities to public authorities like CAG, RTI, and CVC etc is also causing lot of uncertainty in the system. Operationally speaking, difficulties have been reported in performance monitoring in respect of soft performance dimensions. As the governance system matures with implementation of several projects under PPP model, it is hoped that further refinements could be made to the design of the PPP model for obtaining robust results.

# FOREIGN INVESTMENT IN INDIAN CARRIERS

It may be recalled that the basic rationale of opening up of certain sectors to competition, including participation of foreign investors, has been to cater to the enormous size of investments required for a growing economy and the need to bring in cuttingedge technology and the associated best practices of the industry. There is a view that the airline industry qualifies in all these respects and therefore the need to facilitate larger capital inflow from abroad into the country. Foreign investment is not just a source of equity investment for developing economies, it also brings with it considerable benefits, viz. technology transfer, management know-how, and access to international markets. The mechanism of the relationship has been through inflow of investment funds, infrastructure and technology transfers, enhancement of human capital, improvement in the quality of the factors of production, faster growth of output and employment, increased productive efficiency, consumer benefits and access to global markets.

# FOREIGN DIRECT INVESTMENT

Until recently, government policy prohibited FDI by foreign airlines in the equity of locally incorporated scheduled and non-scheduled passenger airlines. A revised policy sponsored by the Ministry of Commerce, issued late in 2012, now permits foreign airlines to invest in such airlines up to a limit of The EU is the first region in the world to remove airline ownership restrictions. One of the best ways to access the EU market is through cross-border acquisition. Other motives for cross-border acquisition are to provide feeder traffic to a home hub and for slot acquisition.

49 per cent of their paid-up capital. The policy also permits foreign institutions other than foreign airlines to invest up to 49 per cent in scheduled carriers and, subject to government approvals, up to 74 per cent in non-scheduled carriers<sup>79</sup>.

The issue was hotly debated, as it has been on several occasions in India's recent economic history. The major thrust of the debate is whether civil aviation is a sensitive industry—from both an economic or security perspective—and thereby deserving of protection from foreign ownership and its attendant effects. Recent turmoil in the industry and the urgent need for fresh capital injections in many airlines, prompted the government to issue this revised policy. However, Air India remains exempt from its provisions.

The policy also makes provisions for Indian carriers to undertake MRO works or to train pilots and other staff at facilities operated by the foreign carrier. That said, certain restrictions are in place that reduce the influence that foreign airlines can bring to bear on their domestic equity partners. For example, all technical equipment and staff associated with such investments require security clearances. No more than a third of the Board of Directors of an Indian airline may be sponsored by the foreign equity partner.

The policy is a welcome change and a much needed fillip for the domestic aviation sector. In the ongoing debate on whether to remove the caps on foreign investment entirely, the following observations may prove helpful: In the process of economic liberalisation, the airline industry remains an exception globally. In terms of both operations and of ownership and control, the airline industry remains restricted. In most jurisdictions, foreign ownership restrictions remain intact on fears of job losses or access issues in national emergencies if a country's commercial airlines are under foreign control, hence keeping the issues of sovereignty and national interest in consideration<sup>80</sup>. A majority of countries both in the developed and developing world have imposed a 49 per cent ownership limit in the airline industry, and India's new policy is in line with this. The US, otherwise a freer economy than most, is more restrictive in the airline sector, limiting the amount of foreign ownership to 25 per cent. Canada too has stayed with 25 per cent foreign ownership limit in Canadian airlines.

The EU is the first region in the world to remove airline ownership restrictions. One of the best ways to access an otherwise inaccessible EU market is through cross-border acquisition. (The lack of accessibility is due to capacity constraints at airports rather than due to government policy<sup>81</sup>). Other motives for cross-border acquisition are to provide feeder traffic to a home hub and for slot acquisition.

The Open Skies agreements that the US shares with 56 countries could provide a framework for the reciprocal elimination of restrictions on foreign ownership, foreign control and cabotage rights if it ever would want to take the lead on liberalising global air transport market. This attempt towards liberalisation could result in conventions wherein nations could exchange rights on a multilateral basis to form a unified, global and fully liberalised market for air transport.

#### OTHER INVESTMENT CONSIDERATIONS

It is noteworthy that during the initial phases of growth in a capital-intensive industry such as this, the CAPEX to sales ratios will be very high, leaving little scope for meeting the working capital requirements. The rapidly changing air transport environment dictated by global economic fortunes is forcing airlines to seek structural adjustments in order to survive. Developments in the early 1990s, including the bankruptcies and mergers of airlines with heavy debt burdens, have prompted a re-examination of the limits placed on foreign capital. Investment by foreign airlines offers an alternative to the borrowing that has undermined the financial health of some airlines. Therefore, this should result in lower costs of capital to the airline industry, particularly in developing countries where these costs are higher.

Given the high-cost debt environment prevailing in the country on account of structural issues, it would be difficult if not impossible to raise these resources at relatively easy terms. It was reported by CAPA in July 2010 that the three large airline groups in India have a combined debt of approximately \$13.5 billion with an annual interest burden of over \$1 billion. For the financial year 2011-12, it is estimated that this would touch \$20 billion for the entire airline industry. And they will require capital raising of a further \$10-12 billion over the next two to three years to finance scheduled aircraft deliveries. Because of the low equity base, raising additional capital by these enterprises will be a challenging task.

<sup>79.</sup> Non-resident Indians may wholly own both scheduled and non-scheduled airlines without seeking government approval.

 <sup>80.</sup> The authority to sovereignty was first codified multilaterally in the 1919 Paris convention treaty recognising that every nation has exclusive sovereignty over its own airspace.
 81. For example, the International Airlines Group is the holding company for both British Airways and Iberia (Spain's national airline). The merger was motivated on the grounds that it would give BA better access to Iberia's Latin American network.

External Commercial Borrowings (ECB) could become an important source of funds to the airline industry which is adversely affected by high cost of loans in India. Further relaxation of restrictions on ECB to the sector will provide much needed relief. This measure would be of very high relevance at this juncture when cost of debt is prohibitively high in India.

# DATA AND INFORMATION TECHNOLOGY

The Committee has noted at several points in this report that good decisions axiomatically begin with good data. Extensive coverage and quality data make it possible for airlines to efficiently plan their networks and schedules to best meet extant and latent demand. Data on airlines' finances and operations assists regulators in efforts at maintaining a market that is viable, competitive and functions smoothly. Authorities that regulate airports, meanwhile, must have access to current and expected airport cost structures, and to current and expected usage. The development of new airports, capacity expansion at existing airports, and the identification of strategies for network management each requires the use of sophisticated economic models to analyse and forecast passenger and cargo traffic. This sophistication notwithstanding, the quality of the results on which these important decisions are based will only be as good as the data supplied.

By rights, the aviation sector should be particularly predisposed to the collection, management and dissemination of complete and robust data. Each of the major agencies that participate in the sector—airlines, airports, government authorities and regulators, MRO service providers, freight forwarders and logistics firms, and so on—are established and recognised, and are subject to the oversight of some combination of domestic and international governments, shareholders, customers, and specialised institutions that set safety and other operational standards. These agencies must operate robust information and technology systems to perform their activities. The closed nature of these systems means that the agencies are in complete control of all the data generated by their activities. As a simple example, airline databases maintain origin-destination records of every passenger, and every maintenance exercise undertaken on every aircraft in their fleet. Moreover, there are in-built checks and balances within the system. For international travel, government customs and immigration databases can be used to verify the origin-destination record for any given passenger. Both airlines as well as MRO service providers maintain logs of the maintenance on an aircraft. Airports and airlines must both account for passenger traffic numbers. In short, the aviation sector normatively lends itself to the collection of high-quality data. That said, there is still much that can be done to ensure the data is deployed and made widely available to best use

# **CIVIL AVIATION STATISTICS**

A number of domestic government departments and international organisations are responsible for collecting and disseminating data on the aviation sector. The Economic Analysis and Policy Section of ICAO collects, compiles and analyses data pertaining to global civil aviation. It is empowered to do so under the statutory provisions of the Chicago Convention of 1944, and has, over the years, expanded its remit to cover more components of the aviation sector. Presently, this includes performance data relating to airlines and the operation of airports, and important data from the management of air navigation services. The Organisation has prescribed a number of reporting forms and all contracting states, including India, are required to provide data pertaining to these. Much of the data is reported annually, though passenger traffic data is available at higher frequencies. Table 3.19 highlights the data collected and made available by the ICAO for each of its member-states. While allowing for easy cross-country comparisons, a limitation of this data is its heavier focus on the international operations of airlines. This is clearly insufficient for Indian purposes, as the growth of domestic aviation is likely to substantially outpace international passenger and freight traffic.

The two organisations responsible for collecting and maintaining the bulk of data pertaining to civil aviation in India are the DGCA and the AAI. The Statistics Division of the DGCA, under authorities delegated from the Aircraft Rules of 1937. requires every entity to

Investment by foreign airlines offers an alternative to the borrowing that has undermined the financial health of some Indian airlines.

which an operational permit has been granted to submit to the DGCA (a) monthly returns regarding the operations of permitted air transport services and (b) annual returns showing the financial results of results of the services or operations during each calendar year.

Other divisions of the DGCA, such as those responsible for air safety and aircraft certification, maintain data on air accidents and the civilian aircraft register respectively. The Directorate of Air Safety maintains data on each accident, date, time and location of the accident, the type of aircraft, the damage to the aircraft, counts and extents of injuries and fatalities, and the ultimately determined causes of the accident. This data documenting the characteristics of accidents is separately available for scheduled and non-scheduled airline operations, flight training, private aircraft, and other purpose-determined categories. The Directorate on Air-Worthiness

maintains an aircraft register with details on the registration number, type and other details of the aircraft, date of registration or de-registration, details of the owner and operator, and so on. Finally, the Directorate of Licensing and Training maintains data on the number and type of licenses issued to personnel authorised to maintain and operate aircraft.

Data collected by the AAI on airport operations and air navigation services is also eventually entered into DGCA databases and disseminated thereon. At the AAI, the Department of Corporate Planning and Management Services collects, compiles, analyses and publishes data on aircraft movements (scheduled and non-scheduled, international and domestic), passenger movement (information on embarkation, disembarkation and transit for both international and domestic passengers), and on cargo and mail (loaded and unloaded, for both international domestic carriage). The DPMS also conducts surveys like normative planning surveys, airport benchmarking surveys, capacity assessment studies and customer satisfaction studies. The aim of these surveys is to assess the peak-hour and annual capacity of existing passenger and cargo terminals, the traffic potential at greenfield airports, and customer satisfaction on services delivered.

Data on aircraft movement is collected from ATC, and on passenger and freight movement from the airlines providing government oversight of this important data. ATC manages the air navigation services which has the primary responsibility for reporting on the en-route facility services.

The Air Traffic Management Unit of the AAI maintains the data on over-flying traffic from 12 airports currently. Data is also collected on various parameters such as the date and time of departure, flight identification, type of aircraft, destination, flight altitude in 100ft increments, and time and location of exit from Indian airspace. This radar-collected data is stored only for 30 days before being deleted.

Data collected by the DGCA and AAI is published in both print and electronic format at least an annual frequency. Traffic data that is summarised by airline and airport is available at monthly and quarterly frequencies.

### **DATA DEFICIENCIES**

## **TIMELINESS**

The usefulness of data is limited to a good degree by the timeliness of its availability. At present, the traffic data collected from Indian and foreign scheduled carriers, from non-scheduled operators and from airports is generally available soon after the end of a defined period. Some operators and airports, however, do not fulfil their data submission obligations for several months at a stretch, compromising the production and usability of aggregate traffic statistics. Deadlines for the submission of financial data are respected even less. Given the fast-changing nature of the airline industry—and especially the high elasticity of its viability to the business climate and to fuel prices—accurate monitoring of the financial health of airlines by the regulatory authorities is crucial.

Given that much of the traffic data is known in near real-time by airlines and airports, an electronic system for the collection of this by the DGCA should help in compliance with submission deadlines. The DGCA should identify data standards, and then implement these standards in internet-based software. Airlines and airports should, over time, be encouraged to update their own internal MIS systems to link directly with the DGCA's software to provide real-time data on traffic and performance.

#### IMPROVING TRAFFIC DATA

The quality of the data collected on several fronts, other than those relating to traffic and performance, needs to be substantially improved. The quality of the data on freight, non-scheduled operators, overflying traffic, and other areas is compromised by ill-defined standards, incompatible competing electronic formats, and ad-hoc collection and dissemination processes. This sub-section considers several specific examples of these practices, and provides recommendations for addressing the resulting data shortcomings.

Data on traffic generated by over-flying aircraft is insufficiently collected and analysed. At present, the data is collected from radar stations at only a few airports and is discarded periodically. The data provides an up-to-date perspective on the changing patterns of flight over Indian airspace, and is therefore useful to devise long-term strategy for the development of airports and other facilities, to guide airlines in planning their route networks and schedules, and to ensure that present and planned ATC systems will be adequate for the forecast airspace congestion. The ANS Directorate should be suitably strengthened and staff skilled to collect, compile and publish this data regularly.

Freight data submitted to the DGCA should be separately identified: freight carried by dedicated cargo airlines, and freight carried by scheduled and non-scheduled passenger airlines. This is already available for domestic carriers, and it ought to be a simple step to extend the practice to foreign carriers. Further, mail is not accounted for in the data on international cargo.

The activities and the operational and financial performances of non-scheduled operators are insufficiently monitored by the DGCA, and the resulting data is inconsistently published. Non-scheduled

Table 3.19 ICAO Prescribed Forms for the Collection of Civil Aviation Statistics

FORM	SUBJECT	FREQUENCY	MAJOR PARAMETERS
A	Commercial air traffic	Monthly/ Quarterly/ Annual	Aircraft kilometres flown, aircraft hours, aircraft departures, passengers carried, Available Seats per KM, Revenue Seats per KM, Passenger load factor, Freight carried, Available Tonnes per KM, Revenue Tonne per KM, Weight Load Factor
В	International origin- destination and revenues (scheduled services)	Quarterly	Revenue traffic by city pairs, passengers carried, freight carried, mail
С	Revenue traffic by flight stage	Annual	Traffic data on number of flights and type of aircraft by airport, capacities available, revenue traffic carried
D	Fleet and personnel (commercial carriers)	Annual	Fleet statistics on number and size of aircraft, utilisation of aircraft, personnel, annual expense on each category of personnel
EF	Financial information (commercial carriers)	Annual	Income statement, Revenues and expenditures, operating results, balance sheet, assets and liabilities
G	Aircraft accidents	Annual	Details of accidents of light (less than 5700 kg MTOW) and heavy (more than 5700 kg MTOW) aircraft
Н	Registered civil aircraft	Annual	Summary of all aircraft on register, No. of large aircraft by type
1	Airport traffic	Quarterly	Airport traffic data, number of aircraft movements, number of passengers embarked, number of passengers disembarked, freight loaded, freight unloaded, mail loaded, mail unloaded
J	Airport financial data	Annual	Income statements, revenues and expenses, investments
К	En-route facility financial data	Annual	
L	En-route facility traffic statistics	Annual	

Source: Economic Analysis and Policy Section, ICAO.

operators, especially those catering to the seasonal leisure and travel sectors, have steadily increased the numbers of passengers carried in recent years. As such, to better understand this industry and the role that it plays in the promotion of and access to Indian tourist facilities, non-scheduled traffic patterns beg to be studied at length. Data on these operators is clubbed together with that on the operations of helicopters, balloons, and private aircraft operators, and is less useful for this aggregation. Meanwhile, the coverage on these non-scheduled operators should also expand to account for those based offshore; at present, only the domestic operations of domestic operators are captured by the data. Package tourism has made the country accessible for many millions of foreign visitors. This tourism often relies on charter flights, and further development of such tourism will surely require better monitoring and regulation of non-scheduled operators.

Not all carriers supply data on traffic between city pairs, and those that do, do not do so in a standardised format. This data is essential for the accurate forecasting of the changing patterns of demand for air travel. For example, it can help decide on the regional hubs and spokes of the future or identify latent demand that is insufficiently or inefficiently met by existing routes or schedules.

#### RECOMMENDATIONS

# **AVIATION AS PART OF A MULTI-MODAL** TRANSPORT NETWORK

- a. Every decision on air transport infrastructure should, ultimately, be able to be traced back to a sense of place and purpose within the wider transport network that is inclusive of all modes.
- b. Network-centric thinking should prevail in planning air transport infrastructure. Efforts should be directed at building complementary regional, national and international air networks.
- c. Good land transport networks should be available to quickly distribute passenger and cargo traffic to and from the region served by an air-

- port. Depending on economics, demographics and geography, this may include mass rapid transit options.
- d. The great advantages of air travel in terms of the savings in time that it offers will be muted if the air network does not cohere well with land-based transport. This is especially true for time-sensitive cargo.

# **CAPACITY ENHANCEMENT**

- a. Airport capacity sufficient to process 1150 million passengers per annum (mmpa) is required by 2031-32. This will require the creation of additional capacity of around 1100 mmpa at a total cost of Rs 5,900 billion.
- b. Expansions in airport capacity should be made with cognisance of systemic endogeneity: decisions made on airports today will influence the airline route maps of the future; equally, the expected airline route maps should, by rights, determine the distribution of today's investment.
- c. Airport-specific investment plans should be dynamic in their response to changing traffic patterns and demand, and yet proactive, by building airport capacity in advance of the period when capacity constraints start to bite.
- d. A National Master Plan should be devised and maintained which identifies clear economic reasons for building airports in generally specified locations. This Plan should address the critique that new airport projects are announced with overlapping or insufficient catchment areas, without regard for airspace issues or the potential for airlines to operate there.
- e. Long-term forecasts indicate that several cities will require second and in some cases third airports in the 20- to 30-year timeframe. Land scarcity means that this will not only become a significant political issue but requires search for the land for second and third airports to commence now with appropriate zoning for such land and reservation of such land for connecting transport corridors.
- f. An Airport Approval Commission should be established within MoCA to review the business plans of proposed airports prior to granting clearance.
- g. There is an urgent need to build airport capacity to process cargo. At the larger airports, capacity can be added through dedicated cargo terminals with land-side facilities let out to freight forwarders and logistics providers.

- Consideration should also be given to building airports that are entirely dedicated to freight. These may be public airports sited at locations that have other excellent transport facilities or are proximate to metropolitan cities and other final destinations for cargo. These may also be private airports that are operated by providers of logistics services. Off-airport cargo processing facilities similar to inland ports and container depots are required to reduce congestion and delays at airports. Air cargo terminals attached to airports may be considered only as transit points if on-site processing facilities are infeasible or costly. Customs services should liberally recognise and man secure bonded facilities off-airport to facilitate the rapid sorting, handling, collection and break-bulk of air cargo.
- h. Sufficient capacity to process passengers is determined by gate and apron capacity to accommodate aircraft; terminal capacity to accommodate passengers; ground traffic management and ancillary aviation processes that ensure quick aircraft turnarounds. Also helpful are improved air traffic and air space management practices, and new radar technology that allows narrower separations in the air and more closely-spaced aircraft movement, as well as movements in adverse weather. Efforts at improving capacity must thus be directed at all of these; pinch-points on any one front reduce capacities across the system.
- Capacity is also determined by size and of aircraft deployed by carriers and by frequency of service. It is recommended that air carriers be free to determine these operational details subject to other regulations.
- j. Helicopters can be enormously useful in tourism, mining, corporate travel, and in providing air ambulance services and homeland security. The development of heliports is important to support the growth of general aviation in India, especially in areas that cannot have runways for financial or terrainrelated challenges. A PPP policy for the development of heliports needs to be formulated, and one that especially applies to remote area service. There is also a need to develop standardised route operating procedures for helicopters.

## **INSTITUTIONAL ARRANGEMENTS AND POLICY**

a. Reforms in the civil aviation sector should emphasise the streamlining of decisions taken by various authorities that regulate the sector aided by clarifications as to their agenda, remit and powers.

- b. The regulatory and policy functions should be clearly separated: the Ministry should focus on devising national policy, and on encouraging and guiding state governments in their efforts to develop the aviation sector.
- c. Meanwhile the DGCA should be replaced with a Civil Aviation Authority responsible for the operational regulation of airlines and aircraft covering areas such as air-worthiness, safety and licensing, with separate divisions for airspace management, environment, competitiveness and consumer protection.
- d. The Centre should progressively withdraw from airport operations where feasible and commercially sustainable. If anything, state governments should play a much more active role in the airport sector since aviation is a key enabler of local economic development and they would be the appropriate partners for investors. Therefore, MoCA should engage with and encourage the states regarding the potential benefits of establishing a more conducive environment for the aviation sector based upon their understanding of the significant economic benefits of airports on their local economies.
- e. With respect to other airports run by the AAI, the government should clarify the future role of the agency. As a first step, the AAI should be separated into two distinct functions: Airport Operations and Air Navigation Services. Each function should initially be corporatised, preparing its own financial statements, continuing under State ownership but managed independently along commercial lines. The Airport Operations Division currently has no clear commercial goals and is involved in a large number of projects, of which many are economically unviable. There would be advantages to breaking these activities into smaller units, separating airport construction from airport management, in turn further breaking these down by region. Further, budget accountability is essential, considering that as the AAI enhances its prime assets and progressively privatises them, it will be left with the task of continuing to invest in airports that are initially not viable. It is also possible for the public sector authority or corporatised entity to act as a landlord while terminal operations are run by private entities.
- f. Air accident investigation should be made independent of the DGCA (or from its proposed new replacement, a Civil Aviation Authority), and a fully autonomous Accident Investigation and Safety Board is proposed. All accident reports should be published publicly

- g. Greater cooperation between the authorities, civic agencies, and the administrators of other transport modes should also be mandated.
- h. The taxation regime that applies to the entire industry from aircraft purchase to aviation turbine fuel to insurance and lease rentals should be revised in view of the distortionary nature of the present system of taxes and their unbundling from the economic tax base.
- i. The present policy on slot management, and especially the ban on the trading of landing slots, is not conducive to a well-functioning and competitive sector. Reviewing and gradually revising India's current slot allocation system will help to reduce a key market barrier to competition and in turn create a framework of more predictable and efficient slot allocation outcomes, as it has in other markets globally. Despite recent changes, there is an urgent requirement for the slot allocation process to become more transparent and for strict oversight of due process as described in stated policy.
- Stated policy on the development of international hub airports require re-visiting as no Indian airline presently has the reach to service such an airport. Further, more important priorities may lie in the development of domestic hubs in view of the huge latent domestic demand for air travel. Instead, more active consideration should be devoted to the development of a regional hub for low-cost carriers, with Chennai being a promising candidate.
- k. The newly-reorganised Airports Authority should then turn its attention to developing new airports together with state governments so as to stimulate their participation in the
- 1. At present the AAI's business model is highly complex as it manages the largest portfolio of airports in the world under a single operator and, in addition to the management and construction of airports, it also has the onerous task of providing air navigation services. Therefore, a recommendation is made for clear structural and commercial reorientation of the authority with a rolling programme of privatisation of the new assets that it creates.

# AIRLINES AND MARKET COMPETITIVENESS

a. Regulatory agencies must walk a fine line between continuing to encourage industrial competitiveness to maximise consumer surpluses and ensuring that the competitiveness is not achieved at the price of unsustainable

or irresponsible actions on the part of the airlines.

- b. It is important to ensure that the barriers to entry are not insurmountable for firms that clearly qualify on account of their financial standing or industry experience and expertise.
- c. It is equally important to manage the exit of airlines from the market with grace and efficiency so as to not impose negative externalities of these exits on the remaining airlines.
- d. Regulatory authorities must take into account (and have the expertise to do so) the financial strength and stability of airlines while permitting entry and also continuing operations. Prospective airlines seeking to enter the market should be scrutinised for the strength of their business plans, capitalisation, and liquidity.
- e. The 20-5 rule should be done away with in favour of more systematic, flexible and transparent rules.
- f. The National Airport Master Plan should incorporate steps to increase capacity of support to, and flexibility for, general aviation. This would include ensuring adequate parking and hangar space, allowing MRO activities on the airport, and developing ATC procedures capable of accommodating increased movements of small aircraft.
- g. Consideration should be given to the development of disused or low-traffic secondary airports, where state governments could support their revival to stimulate air taxi operations for business and tourism.
- h. The DGCA should establish a dedicated Division to deal with General Aviation through, for example, the appointment of a Director for General Aviation.
- i. Given the distortions created in the market and the resulting financial impacts on the entire industry, the government should clarify both the role for Air India, and make a firm policy commitment towards its agenda, its budget and its finances. In a highly competitive, volatile, capital-intensive environment, there should be sound reasons for continued government involvement in airline operations. In the absence of these reasons, the government should instead outline a plan for gradual disinvestment in the airline.

# **AIR INDIA**

a. The government should clarify the future role of Air India. In the present environment, reasons for government to operate an airline in a highly competitive, volatile, and capital-intensive environment must be clearly defined. The Committee has not found persuasive arguments for continued exclusive government ownership and operation of the airline. In the event that these reasons are not defined, a plan for the progressive disinvestment of the government's stake in Air India over a period of three to five years, based on a phased scheme with defined milestones should be identified. The airline will need to be recapitalised, restructured organisationally, its working capital debt burden written off and some divisions made independent and corporatised, with government retaining perhaps a 26 per cent stake. It would essentially be a new airline. It should start completely anew while Air India's current liabilities are separated out and dealt with. It is apparent that with its excessive and unproductive manpower, its failure to invest in the technology required to keep it competitive and with its sub-scale operations, Air India's future prospects remain precarious. Air India must therefore be provided the opportunity to reinvent itself with new professional management, managerial and operational autonomy, while taking over all existing productive assets. If such a makeover cannot be done in a public sector or joint sector framework, it will need to be privatised. Failure to implement such a plan will continue to drain over \$1 billion per annum of tax payers' money each year over the next 10 years, which is surely unacceptable in the light of our national priorities. Meanwhile, Indian civil aviation will suffer and India will not be able to develop major hubs.

# **FUNDING**

- a. The government must decide clear and stable rules governing the foreign ownership and operation of domestic airlines. This foreign ownership may also be expected to bring additional benefits of access to cheaper debt finance, technology transfers, management knowhow and access to international markets.
- b. Careful regulations for assessing the stability of private equity and debt funding of domestic airlines should be developed, with a view towards promoting the overall financial health of the sector.

- c. The unique features of the aviation industry with the largest costs and substantial revenues determined in offshore markets mean that there is support for the relaxation of restrictions on External Commercial Borrowings by airlines.
- d. Each airport funded by the AAI should be endowed with a set of operations goals and a development plan, have measurable targets by which performance can be gauged, and be encouraged to adopt transparent reporting processes.
- e. For joint-venture airports, the task before regulators and administrators is to devise proposals that attract participants with both suitable financial resources and technical expertise such that stable long-term ventures can be successfully negotiated.
- f. The instabilities seen in the viability of some PPP airports has been manifest in excessively high increases in landing charges sought and approved well after the project is launched. To combat this, the permissible structure for charges (and their growth structure) should be made known to all parties at time of tender. This is to allow consortia to bid accordingly, and to ensure appropriate levels of investment in the airport network.
- g. Airport development under PPP has proceeded well insofar as projects have been delivered and are operated largely to the desired standard. New public-private models will be required to fund the redevelopment of airports in non-metropolitan cities with lower traffic.
- h. At all airports, substantial scope exists to raise revenues from non-aeronautical activities, including from restaurants and food service, car parking, and rentals for concessions, retail, banking and other services.

#### **PRICING**

- a. There is substantial scope for airports to ensure that their pricing regimes for landing charges, passenger services, cargo, parking and hangar space, and other items like security and noise-related charges, are fairly determined and transparently applied.
- b. The regulation of tariffs at airports operated under the PPP model must be strengthened with more careful accounting of benefits and costs to various stakeholders, restructuring of tariff schedules, and with a view towards maintaining the dynamism of Indian civil aviation.

- c. Aviation Turbine Fuel pricing should be reformed. The tax structure on the fuel should, at a minimum, be rationalised and simplified, and also more closely justified by observed market failures or tied directly to the expected future development of the aviation industry. Further, with ATF being much more expensive in India than regional airports offshore, there is also a case for reducing taxes to this baseline. Competition in the ATF market should be encouraged and any efforts at cross-subsidising (as with other fuels) should be avoided.
- d. The pricing of air services should largely be subject to market considerations, and remain under the purview of airline operators on a day-to-day basis. However, substantial regulatory vigilance is required to maintain market integrity and for consumer protection. This is motivated on the grounds of ensuring pricing that is fair and reasonable, non-predatory and non-discriminatory, and transparent. To that end, clearer rules are required

# MANAGING THE ENVIRONMENTAL IMPACT

- a. Globally, the airline sector has set itself the goal of reaching carbon-neutral growth by 2020 and that of reducing aviation's overall carbon-dioxide emissions by half between 2005 and 2050. Relative to the expected size of the industry in 20 years' time, India is well-placed to adopt an environmentally-friendly growth path, which is preferable to post-hoc remedies to entrenched systems. With aviation equipment being internationally fungible, India is likely to automatically benefit from technological advances that improve fuel efficiency, and reduce emissions. The major domestic regulatory impetus will lie on policies that encourage more efficient flight paths, glide landings, fleet modernisations and renewals, and higher capacity utilisations.
- b. As cities and airports both expand, increasing shares of India's urban populations will lie under a flight path, and will expect reasonable efforts on the part of authorities to shield them from the worst excesses of aviationrelated noise.

# **HUMAN RESOURCES**

a. Institutions that regulate civil aviation will need to be strengthened with the addition of substantial numbers of staff skilled in network economics and regulation, certification, safety, setting and implementing standards, finance, and law. Existing private institutions do not offer sufficient depth and variety in their course content, and the infrastructure facilities available to them are insufficient.

- b. Thus, the desired growth in Indian aviation will require the country's technical colleges and flying schools to churn out engineers, pilots, air traffic controllers and other key staff in substantially greater numbers than at present.
- c. On the management and regulatory front, there is a requirement for an improved and larger cadre of airline administrators and managers, regulatory economists and planning professionals.
- d. An institute for training civilian helicopter pilots should be set up.
- e. There is an absence of formally recognised educational programmes at the degree and diploma level in the field of civil aviation. Budgetary support should be provided, and industry support encouraged, for the expansion of aviation programmes at universities, especially at the graduate level. In conjunction with industry and academia, the State should also boost the value of these programmes by defining qualitative and quantitative standards for the academic programmes. More generally, the systems of accreditation of the various training institutes should be reviewed with a view towards ensuring minimal standards in educational outcomes.
- f. The training of a new corps of air-traffic control officers requires immediate priority. Partnership options with international ATC training institutes and with the Indian Air Force should be explored to enhance ATC-capacity.
- g. Foreign participation or investment in an Indian university for aviation management should be encouraged.

#### **AIR CONNECTIVITY IN REMOTE AREAS**

- a. Air travel can be the quickest, cheapest, and most environmentally-friendly class of transport links that can be extended to remote regions with challenging geography or topography.
- b. The current arrangement for ensuring essential air services is not satisfactory. Air connectivity in remote areas is largely concentrated on routes connecting state capitals. Meanwhile, the Route Disbursal Guidelines intended to ensure minimum connectivity to remote and inaccessible regions cast a burden on the commercial health of airlines in India. Essentially being a cross-subsidisation tool, several distortions arise from its implementation, and further reliance on these guidelines

- will be unhelpful at a time of industry-wide financial stress.
- c. The RDGs create a market distortion and also a potential moral hazard for airlines to find ways to bypass the obligations. Hence, there should be a move towards a direct subsidy model with viability-gap funding.
- d. The establishment of a non-lapsable exclusive fund to provide explicit and direct subsidies to airlines as a form of viability-gap funding is a preferable alternative to ensuring service to remote and inaccessible, and so financially non-profitable, areas of the country.

#### STATISTICS AND DATA

- a. Data furnished by airline operators to the DGCA should be processed, subject to crossverification. The DGCA should work closely with MIS personnel at the carriers to define systems for data collection, verification and dissemination.
- b. A country-specific forecasting model should be developed for the Indian aviation market to aid infrastructure planning, route management and expansion, and regulation. Effort should be devoted to studying the decomposition of airfreight and passenger traffic in greater detail, and a database built of origins, destinations, and the nature and value of shipments. This will provide valuable information on the candidate sites for dedicated passenger and cargo facilities.
- c. Aviation is grossly underestimated in the national accounts; the present compilation of National Account Statistics should be modified to reflect the wider array of activities that relate to the aviation sector. A system of satellite accounting for the civil aviation sector should be introduced, especially in cases where direct data collection is not possible.

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