

# Connectivity and growth

## Directions of travel for airport investments

November 2014

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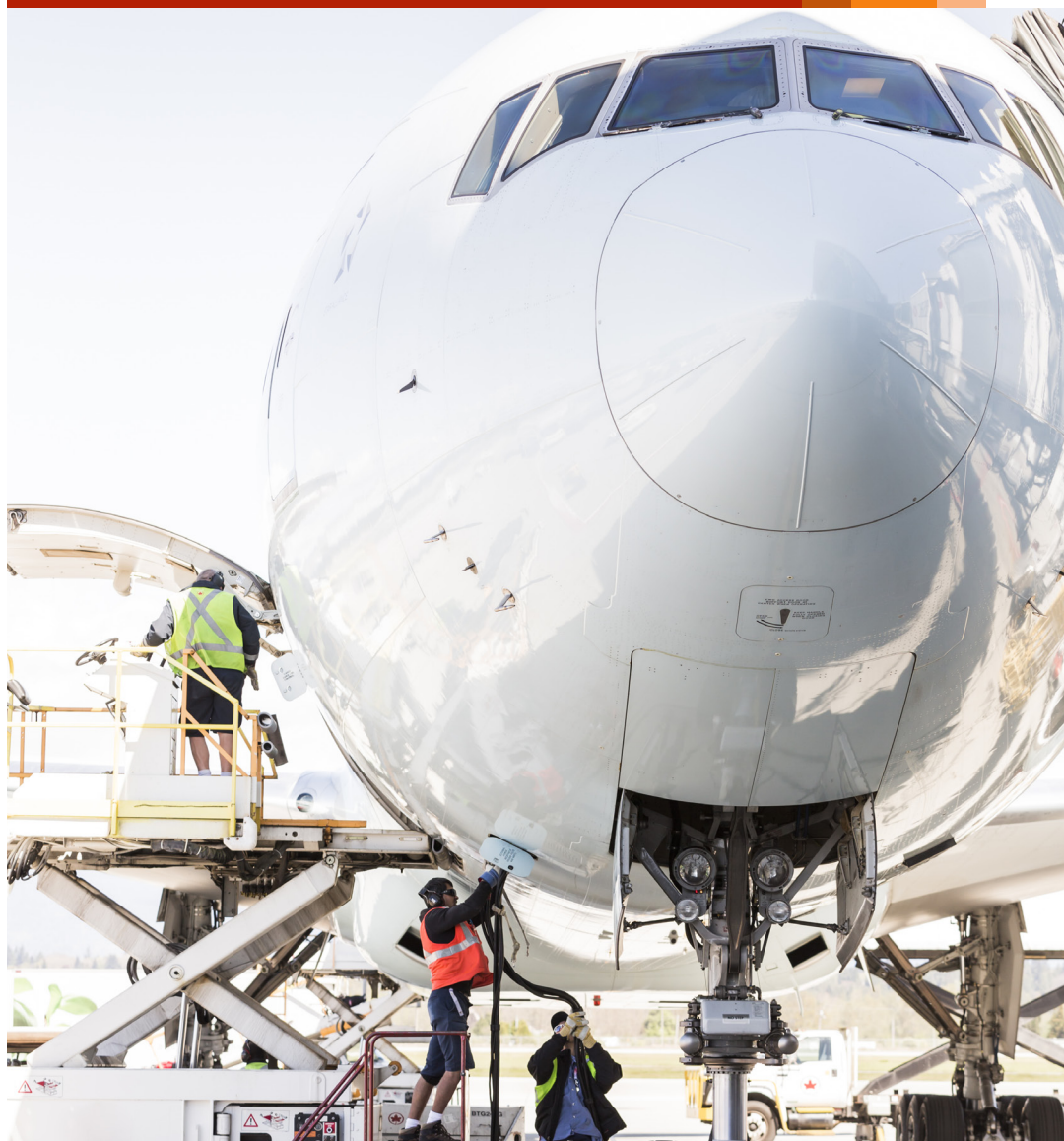
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# Introduction

The aviation market has always been a cyclical one – a long-term growth trend punctuated by demand shocks that rein in investment and impact traffic. As we emerge from the longest sustained recession in 80 years, the indicators are that the global aviation market has turned a corner, with traffic returning, fuel prices falling, and the impact of new technology and business models aiding a return to profitability. However, patterns of growth have not been consistent. While emerging markets, especially in Asia and the Middle East, are strong, recovery in Europe has been weak and patchy, to say the least.

As we have predicted, the ‘pivot to Asia’ continues in the aviation industry, following strong economic and population growth patterns – not only increasing the Asian links to the world but, significantly, building connectivity throughout regional and domestic markets.

As patterns of connectivity shift and established markets such as Europe and Japan see their markets transform away from outbound growth and toward inbound opportunities, the impacts of global aviation infrastructure investment will be significant.

In this year’s compendium we have focussed on the changes being experienced in the global aviation markets. The aviation sector does not operate in isolation; on the contrary, it is inextricably linked to globalisation, regional economic development, tourism and national competitiveness. Connectivity is at the heart of the value provided by the aviation sector to the broader economy, and it is a measure of the health of an airport, a city, and a region. We explore the relationship between the concept of ‘propensity to fly’ and local aviation market potential as we search for new growth markets. And we focus on

Asia, looking at the challenges and opportunities that rapid aviation development brings.

We also explore how the airport transaction market and airport valuations have been impacted as the aviation market aligns to new patterns of growth. Transaction growth in Asia and in new markets such as Japan and the Philippines will allow us to test and challenge our previous assumptions regarding airport values. New players will continue to enter the aviation infrastructure market, as regional opportunities are taken up by new players expanding their interests and taking advantage of the opportunities that connectivity brings.

I hope you will find this year’s articles interesting and provocative, and I look forward to debating and discussing these issues with you over the coming year.

Yours truly,



Michael Burns  
Partner, PwC UK

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# *Planning for sustainable aviation growth*

Dr Andrew Sentance

The global economic recovery remains uneven, but there is a clearer pattern of growth now. After a surge in economic growth in 2010 and 2011 as the major economies bounced back from the financial crisis, global GDP growth has been relatively subdued since 2012. According to the IMF, world economic growth averaged 3.3% during 2012-2014, slightly below the 3.5% long-term average since 1980.

Three main factors have contributed to this muted global growth performance. First, the major Western economies are experiencing a disappointing recovery – because the tailwinds of easy money, cheap imports, and strong confidence that were present before the crisis are no longer supporting growth<sup>1</sup>.

Second, the poor performance of the economies of southern Europe and France has exerted a downward drag on growth in the euro area and the European Union more generally. A substantial part of the European economy is experiencing a prolonged structural adjustment. Moreover, economic policies have been slow to correct underlying problems such as lack of labour market flexibility, high

public spending and associated tax burdens, and a less business-friendly and business-like economic climate.

Third, the major emerging market economies have experienced much more variable and uneven performance. China continues to power ahead – though even here, growth has eased back from the 10% plus average GDP increase in 2002-2011 to around 7-7.5%. India continues to grow at 5-6% a year, and the IMF expects it to be growing faster than China by the end of this decade. But outside Asia, a number of other large emerging market economies have been struggling. During 2012-2015, the IMF now projects that Brazil and Russia will both grow on average by just 1.3% a year. South Africa is not doing much better, with around 2% growth. A common feature of growth in Brazil, Russia, and South Africa is that it is heavily driven by energy and commodities, where global prices have been weakening since 2012. We have also seen political instability adversely affecting growth in all three of these economies – most recently in Russia.

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<sup>1</sup> “Rediscovering growth: After the crisis” - <http://londonpublishingpartnership.co.uk/rediscovering-growth-after-the-crisis/>

## Connectivity is at the heart of what makes airlines successful.

But it is also possible to take a ‘glass is half full’ view of this global growth environment. There are three poles of growth in the world economy that appear to have survived and rebounded since the global financial crisis: the Asia-Pacific economies, North America, and northern and eastern Europe (including the UK). These three poles (including Japan and Australia within the Asia-Pacific region) account for nearly three-quarters of total world GDP. Sub-Saharan Africa is another dynamic region of the world economy with GDP growth around 5% in 2014 and forecast to continue an average rate of 5-6% in the next five years. If Africa continues to perform well along with the other three major growth regions, we will have robust growth across 75-80% of the world economy in the second half of this decade.

This is an attractive prospect for the global aviation industry – and it is reflected in the investments and plans

being made for expansion. Aircraft orders remain strong, and new orders continue to outpace deliveries. The current order books for the major aircraft manufacturers imply a 50% increase in the commercial aircraft fleet over the next 7-10 years.

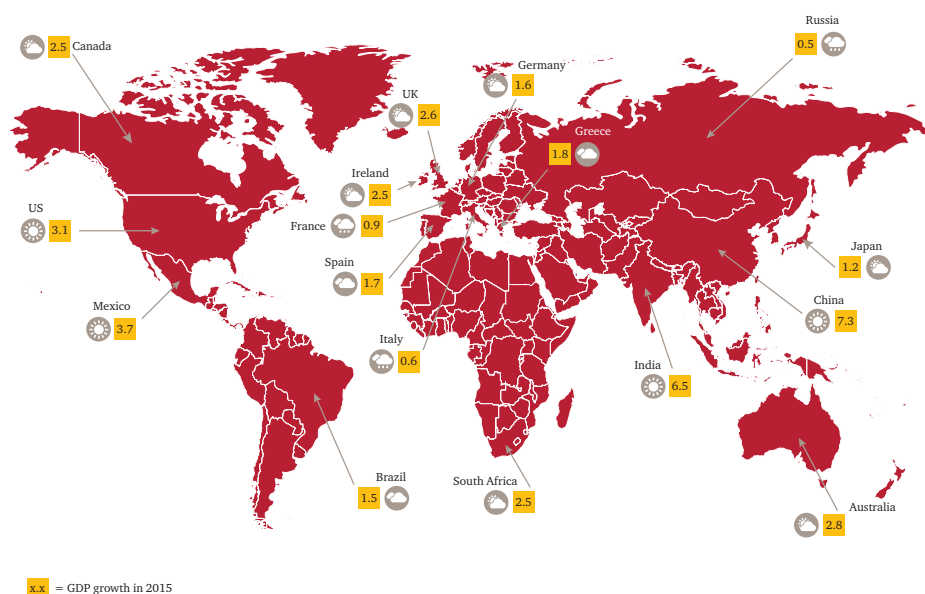
But we have been here before. When the world economy and the air travel market turns up, airlines pile in orders and then the next downturn exposes a major capacity glut. How do we avoid such a feast-and-famine outcome in the next 5-10 years? How should the major players in the aviation industry plan for sustainable growth?

For airlines, the watchwords should be profitable growth, cost control, and connectivity. Growth opportunities need to be profitable. The airline industry has been a low margin industry for too long, and the more successful modern airlines now recognise this. When I was Chief Economist at British Airways, we set a

10% operating margin target in the early 2000s, which compared with a 2-3% historical average for the industry prior to that date. Chasing volume growth supported by declining yields has bought financial losses and turmoil to many airlines and their investors. So airlines need to undertake a careful evaluation of growth opportunities, both in terms of new routes and additional frequency of service. They should not be seduced by the optimistic forecasts presented to them by aircraft manufacturers, which rarely mention the profitability of growth opportunities.

To achieve profitable growth, airlines need to control costs and develop their networks by improving connectivity. Connectivity is at the heart of what makes airlines successful – finding new routes, either directly or via an efficient hub-and-spoke network operation. As new cities develop around the world – particularly in Africa, Asia, and other emerging markets – there will be many new route development opportunities.

**Figure 1: Global growth prospects for 2015**



Source: PwC main scenario

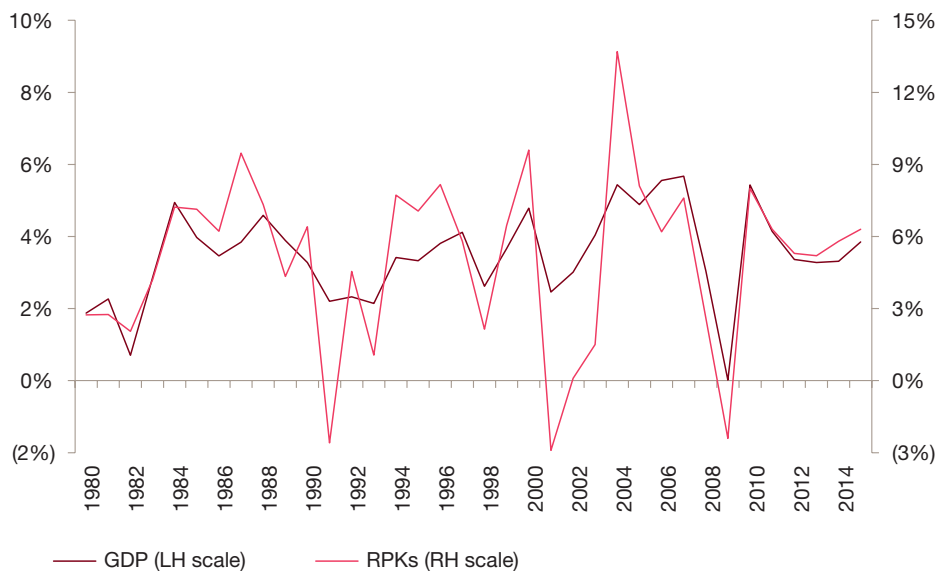
Airports face a different set of growth issues. Unlike airlines, which can expand capacity quite quickly by ordering a few more planes and finding new runway slots to operate, airport capacity expansion is lumpier, requiring longer lead times as well as much more intensive stakeholder dialogue. This is most noticeable in the major Western economies. In the UK, we have had 15 years of discussion about new runway options at the major London airports, and still no decision has been made – let alone any concrete or tarmac laid. The UK may be an extreme example, but similar issues exist in many other advanced economies where there is great sensitivity about the local and environmental impacts of aviation expansion.

In developing and emerging markets, airport expansion appears easier – and is often supported strongly by the regulating authorities as a means of providing strategic support to economic growth in a region or nation. But that carries a different risk – of over-ambitious expansion – akin to the problems that the airline industry has experienced by over-investing in capacity in the past. Also, alongside airports, airspace capacity needs to be developed. In Europe and North America, there is a high degree of capability in airspace management that can be deployed in Asia, the Middle East, and Africa as these regions start to experience airspace congestion around major cities and airport hubs.

The final issue bearing on the aviation growth agenda – which affects aircraft/engine manufacturers, airlines, airports, and airspace managers alike – is the environmental challenges facing the expansion of the industry. At face value, the 50% increase in the commercial aircraft fleet represents a potential increase in aircraft noise, local air quality problems around airports, and greenhouse gas emissions. The aviation industry is dealing with all these issues – but the pace of technological change will not counter the adverse environmental impacts of future growth in all areas. A sustainable growth trajectory for the aviation industry therefore requires an acceleration of effort to address the environmental consequences of expansion – which will raise costs for the industry and air travellers over the longer term.

**Figure 2: Global growth is a key driver of air travel**

Air traffic (RPKs) and World GDP – % per annum change



Source: IMF and ICAO/IATA

The aviation industry worldwide has been remarkably resilient in the aftermath of the global financial crisis. The industry has coped much better than after 9/11, which created more financial distress and business failures. One reason for the improved coping is that there has been a process of industry consolidation in the more mature regions – US and Europe. At the same time, there have been significant growth opportunities in Asia, the Middle East, and Africa.

But as the industry shifts from survival to expansion mode, new issues are emerging: the risk of over-expansion in airline capacity; the difficulties of expanding airport and airspace

capacity where it is most needed; and the long-term environmental challenges of a rapidly expanding global aviation industry. Looking ahead, these are the big challenges to sustainable growth of the aviation industry.

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# ***Airport transactions: Airport privatisation elevates deal activity to higher altitudes***

Bernard Chow and Colin Smith

## ***Executive summary***

Your average airport investor is a pretty opportunistic, yet conservative sort: people rarely make investments in airports for short-term gain. Consequently, despite the shoots of economic recovery only starting to show in 2013 and 2014, airport investors were ahead of the curve – seeing transactions rocket from a low point of US\$3.5 billion in deals in 2008 to c.US\$21 billion in 2012 and US\$18 billion in 2013.

On top of investor foresight, governments have finally come to grips with the requirements of privatisation deals, with assets sold in Portugal, Brazil, North America, and Turkey, and with Japan, Greece, and France launching processes. We expect this trend to continue, with 22 countries currently looking to let concession at least 40 assets.

Whilst deal activity has risen significantly, optimism in the investor base has not followed suit. Values have risen much more cautiously, with average deal multiples in UK/Europe recovering a little, but not reaching the heady pre-crisis heights. Some recent deals suggest that the competition for assets may be starting to intensify, particularly for attractive assets, which may drive deal multiples upwards – we will continue to watch developments with interest.

## ***Peaks in deal activity***

The airports industry has been a hive of deal activity over the past 24 months, with deal volumes reaching a peak of 20 deals in the second half of 2013, generating deal value of US\$13 billion. Deal volumes and value have since fallen in the first half of 2014, which we anticipate reflects a gentle breather before a further wave of airport privatisations in Japan, France, Greece, and Southeast Asia as well as airport exits in the UK/Europe.

Airport deal activity has historically been driven largely by European transactions, particularly in the UK, which has by far the most developed private marketplace for airport assets. In the first half of 2011, UK/Europe airport deals accounted for 83% of deal volume.

However, the UK market is becoming saturated (and stunted to a certain extent by its inability to decide on the location of new runway capacity). As a result, investors have cast their nets further afield, with fund managers looking for opportunities to invest in growth; direct investors focusing on more stable, reliable assets; and strategic buyers focusing on assets that complement existing portfolios.

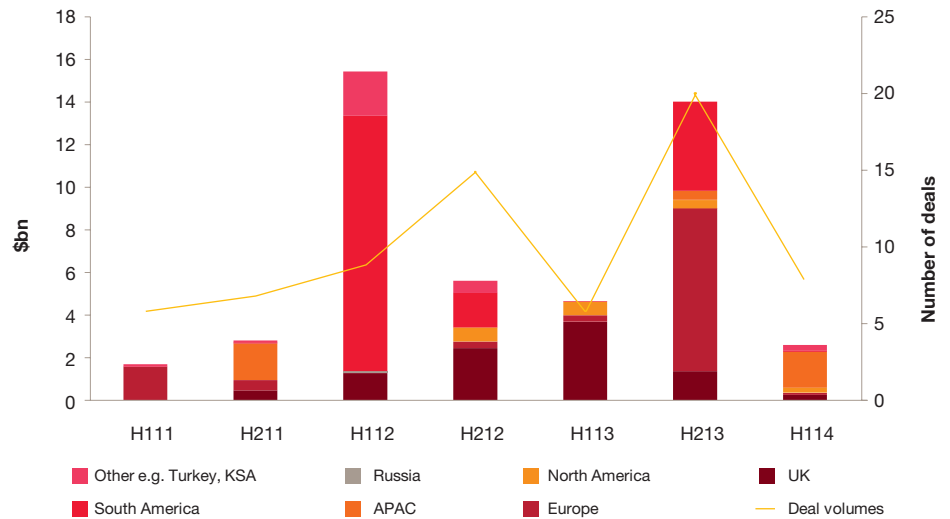
## The airports industry has been a hive of deal activity over the past 24 months.

The first half of 2012 saw the first real emerging market activity, with Brazil leading the charge (the US\$9.5 billion Guarulhos International Airport and US\$2.2 billion Viracopos International Airport privatisations). The UK and Europe responded in kind, taking a 70% share of deal activity in the second half of 2012 and first half of 2013. Notable European deals in that period were the ANA privatisation (US\$4.1 billion) and Heathrow finally saying goodbye to Stansted (US\$2.3 billion), whilst Manchester Airport Group sold a stake in itself to fund the Stansted acquisition (US\$1.4 billion). Together with Ferrovial's sale of chunks in Heathrow itself to pension and sovereign wealth funds (US\$1.5 billion) and Hochtief's eventual disposal of its airports division (US\$1.5 billion), the glut in European activity over the 12-month period was compounded.

### Privatisations

South America has been the main region for airport privatisations since January 2012, accounting for US\$17 billion of the US\$21 billion globally from January 2012 to September 2014. In Brazil, five airport concessions were awarded in Sao Paulo, Rio Grande do Norte, Distrito Federal, and Belo Horizonte. Colombia and Panama also saw airport privatisations. Outside of South America, the main privatisations were in Saudi Arabia, Turkey, Puerto Rico, and Croatia.

Figure 1: Global airport deals by region



Source: Infranews, PwC analysis

Notable in its absence was the anticipated liberation of US airports from government and state control. Only Puerto Rico managed to get off the ground, with Chicago Midway again falling by the wayside. Going forward in the US, a terminal concession-based model appears more likely than full airport privatisations, which may limit interest from mainstream airport investors.

## Stable growth in valuations

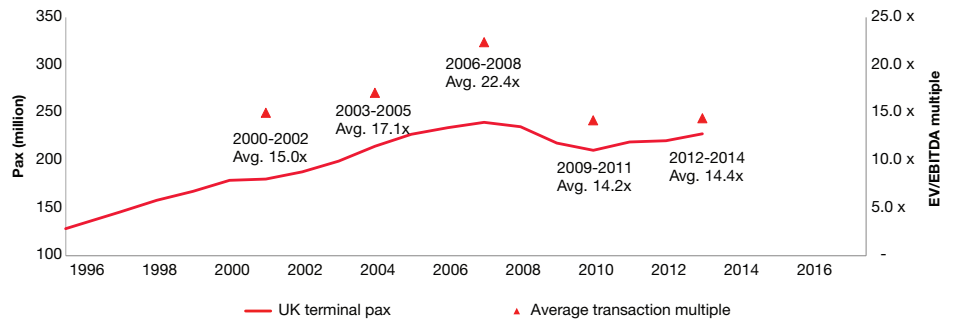
Despite market conditions appearing to set the stage for a valuation bubble, evidence suggests that investor caution has prevailed for most assets, albeit with some exceptions.

As explored in our airport valuations review later in this document, average deal multiples have increased – particularly in Europe – with EBITDA multiples of 14-18 for faster growth regional airports and 10-14 for mature, larger airports.

The trendline suggests that valuations are unlikely to see a rapid, sustained return to the heady heights of 2006-2008, when multiples of 20-plus were not uncommon. That said, some emerging market deals are bucking the trend, with investors banking on strong growth from new airports with untapped commercial potential.

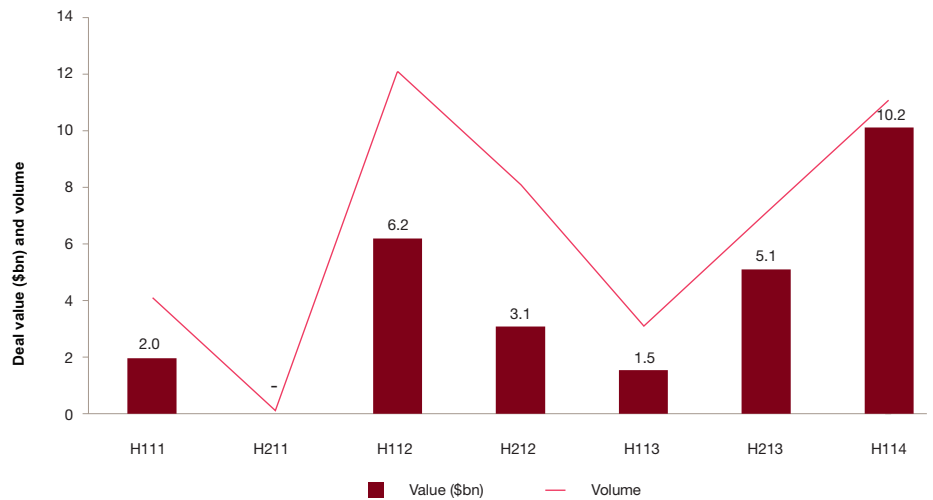
**Refinancing activity** – Alongside a return of airport deals, we also note a resurgence in refinancing activity, largely to replace acquisition debt raised pre-crisis, as airport owners take advantage of improved trading conditions driven by recovery in air travel and increased availability of debt financing.

Figure 2: UK airport traffic and European transactions



Source: CAA, DfT, PwC analysis, Press

Figure 3: Global refinancing activity



Source: Infranews, PwC analysis



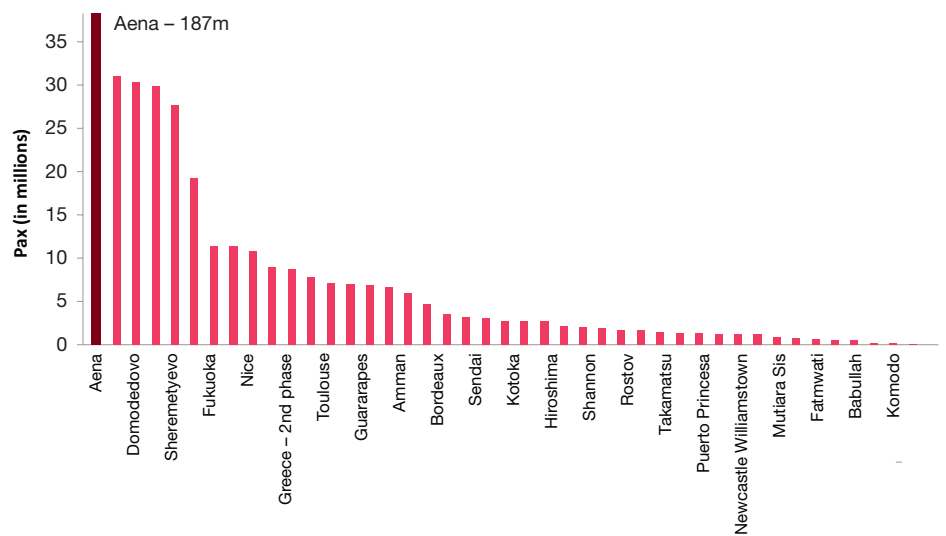
## The investor landscape

As highlighted earlier, we expect privatisation activity to continue growing apace, as airport sales remain attractive to governments seeking to realise cash through asset sales. Airport privatisations also serve as a strong mechanism to encourage investment and stimulate economic growth.

Greece, Spain, France, Japan, Brazil, and Ireland have all announced separate privatisation drives between now and 2016. In Europe, the first wave of Greek and French regional airports will have received investor bids in September/October 2014 whilst the partial privatisation of Aena was also launched with an envisaged stake sale of 21% being made available.

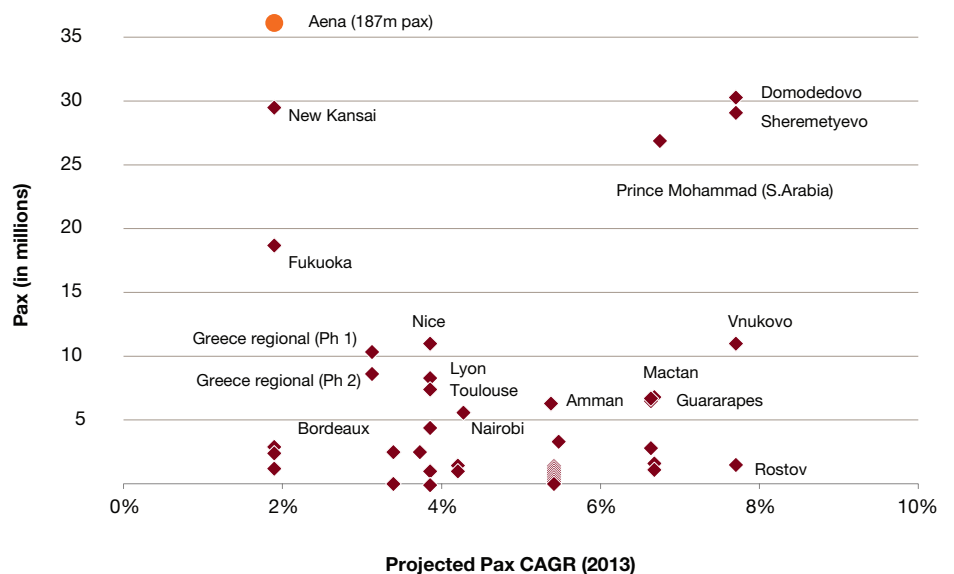
The Japanese Ministry of Transport meanwhile highlighted four airports for its first wave of privatisations, starting with Sendai Airport and followed by New Kansai, its third largest airport. The government is looking to let concession four airports between 2014 and 2019, followed by a further 16 airports.

Figure 4: Global pipeline airport privatisations



Source: Various news sources, PwC analysis

Figure 5: Global pipeline airport privatisations – current and projected pax growth rates



Source: IATA Country forecast, PwC analysis

Note: Projected pax growth is based on IATA's forecasts for the country rather than the airport specifically

## Other opportunities

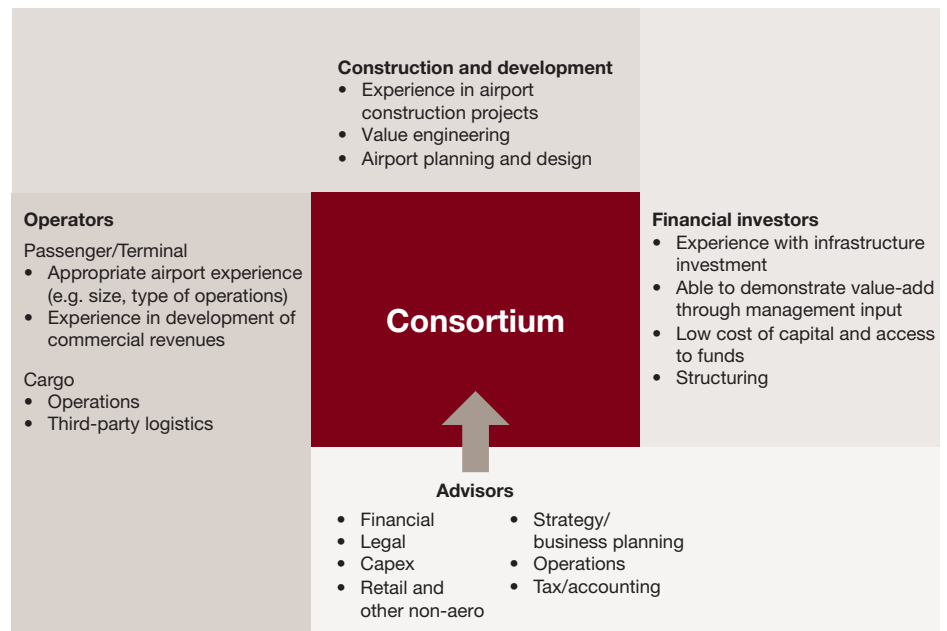
Notwithstanding the fact that airport privatisations are likely to dominate the headlines and deal activity, airport investors' interests should remain piqued by private investment activity. In the UK alone, London Gatwick, London City, Bournemouth, Doncaster, and Leeds Bradford airports are all expected to see transaction activity over the foreseeable future. With closed-ended infrastructure funds looking to realise value, deal volumes should stay healthy, although the proliferation of off-market deals looks set to continue. Recent examples include Ferrovial's concurrent stake sales in Heathrow and its and Macquarie's acquisition of Heathrow's regional airports (Aberdeen, Southampton, and Glasgow) and Ontario Teachers' pre-emptive acquisition of Macquarie's stake in Bristol airport.

## How has the investor market changed?

With an established infrastructure investor base ranging from private funds and publicly listed vehicles to major municipal pension funds and trading houses, airport investments have unsurprisingly also become more specialised.

Major capital-city airports will attract no shortage of pension fund and sovereign wealth bidders, whilst smaller and regional airports will attract investors who believe they can help management teams execute ambitious business plans and drive value through improved performance throughout the business.

Figure 6: Building a strong consortium



On privatisations, credible consortiums are the key to success, as governments look for a combination of price and trusted airport operators. However, coming together to execute a successful acquisition is the easy part: aligning ongoing interests between financial investors and operating parties will prove more challenging, as will giving management a clear view of the post-acquisition business plan.

## Final thoughts

With no shortage of airport opportunities ahead, the market rightfully seems an attractive one to infrastructure investors, who continue to attend industry conferences in numbers.

With economic turbulence subsiding but not disappearing altogether, airport investors would be wise, however, to exercise a degree of

restraint. The recent economic downturn made it abundantly clear that airports are not homogeneous assets, and not all are worth investing in, unless the price is right.

In particular, smaller and regional airports have a habit of developing winners and losers, and getting the right team on board to execute a transaction is likely to maximise chances of on-deal and post-deal success.

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# ***Air connectivity: Why it matters and how to support growth***

Hayley Morphet and Claudia Bottini

Global air travel has changed considerably over the past decade. Thanks to major improvements in technology, air travel is more efficient, making distances between countries seem shorter than ever. Meanwhile, the continued growth of low cost carriers (LCCs) and their increased penetration into emerging markets has made air travel more accessible, while the rapid expansion of Middle East hub carriers has changed intercontinental travel patterns. As a result, air connectivity has also changed.

But what is air connectivity, exactly? The International Civil Aviation Organization (ICAO) defines it as an indicator of a network's concentration and its ability to move passengers from their origin to their destination seamlessly<sup>1</sup>.

Air connectivity is key to unlocking a country's economic growth potential, in part because it enables the country to attract business investment and human capital. An increase in air connectivity also spurs tourism, which is vital to many countries' economic prosperity.

By understanding how air connectivity is measured, how it has changed, how it relates to economic growth, and what drives it, key aviation stakeholders (i.e. States, Airports and Airlines), can make strategic decisions on how to enable and unlock the air connectivity potential of a country.

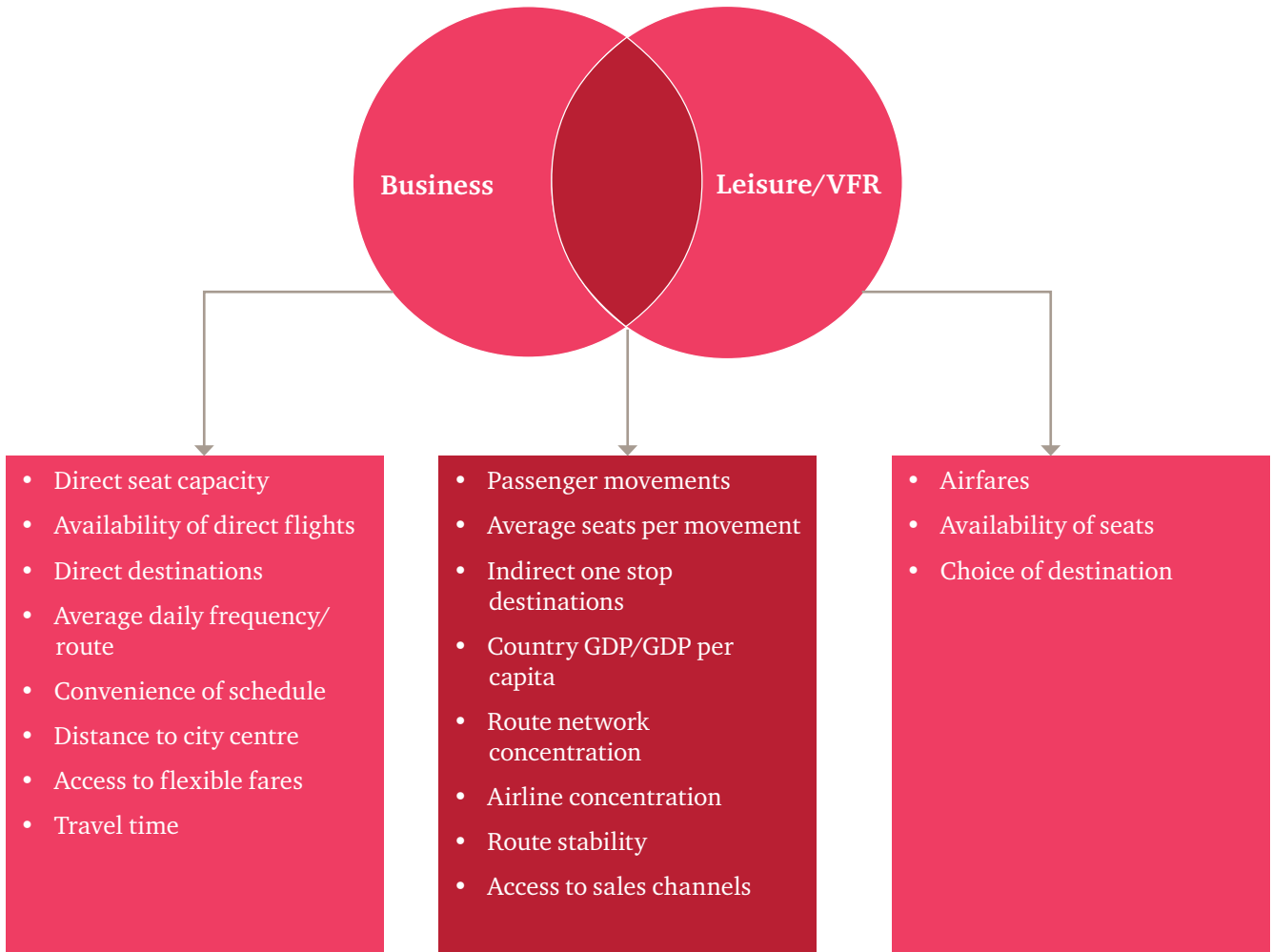
## ***How is air connectivity measured?***

Air connectivity is measured using a variety of measures at various levels of granularity. These measures – including total passenger movements, airfares, the number of direct destinations, and travel time – can serve as standalone proxies or may be combined to create a measure capturing different features of the air-transport market. (See Figure 1.)

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<sup>1</sup> ICAO (2013), Worldwide Air Transport Conference (ATConf/6-WP/20)

Figure 1: Air connectivity measures



Note: VFR is a subset of leisure travel. However, this segment differs from leisure in that passengers don't have a choice of destinations and appear to be less sensitive to price (price, however, may determine how frequently they travel).

Travellers have different priorities, depending on the purpose of their journey. That means different measures can be used to assess air connectivity for each passenger segment. For instance:

- **Business travellers** tend to be time sensitive and relatively indifferent to fare levels. Frequent and flexible service that enables passengers to quickly change flights to a more convenient time, coupled with easy surface accessibility, matter most to this segment. Thus air connectivity for

them could be measured by frequency of service, convenience of schedule, travel time, number of direct routes available and proximity to the city centre.

- **Leisure travellers** care more about fares, with cost-effectiveness often the most important factor in decisions about whether to travel and where, especially for short breaks. An unacceptably high fare could cause them to change their mind about their destination. Measurements of air connectivity for this segment should therefore include fares.

- Visiting friends and relatives** passengers are travelling primarily to see loved ones. In some markets, this category of travel is substantial. Passengers travelling for this purpose tend to consider fares a major factor in determining how frequently they travel. However, unlike leisure passengers, they don't have the option of changing their travel destinations if fares are too high.
- The importance of air connectivity has led to the development of a number of indices in aviation economics literature. (See Table 1.) Each measure aims to capture a range of factors influencing connectivity. At the same time, aviation stakeholders looking to understand the integration of country (or city) within the global air network can tailor their choice of air connectivity indices to suit their needs by identifying the criteria most important to the country (or city) they're interested in and by developing an integrated index which takes multiple variables into account.

**Table 1: Air connectivity indices in aviation economics literature**

Measure	Description
<b>York Aviation Business Connectivity Index</b>	Captures economic importance of destinations, measures value of connectivity to businesses
<b>Netscan Connectivity Index</b>	Captures seat capacity, accounts for both direct and indirect connections and for transfer time as well as potential delay time when connecting
<b>IATA Connectivity Index</b>	Captures the importance of destinations based on the size of the final destination airport
<b>World Bank Air Connectivity Index</b>	Weights value of a route based on the number of onward connections available reflecting benefits of hubs
<b>World Economic Forum Connectivity Index</b>	Presents data on scheduled available seat kilometres per week in 2012 for a sample of 144 countries

Source: Various

## How has air connectivity changed?

Over the past 10 years, the aviation industry has experienced the effects of various shocks (such as terrorist attacks, natural disasters and pandemics), a weak economy and rising fuel prices. The industry has shown its resilience by adapting itself to satisfy the needs of an ever evolving market.

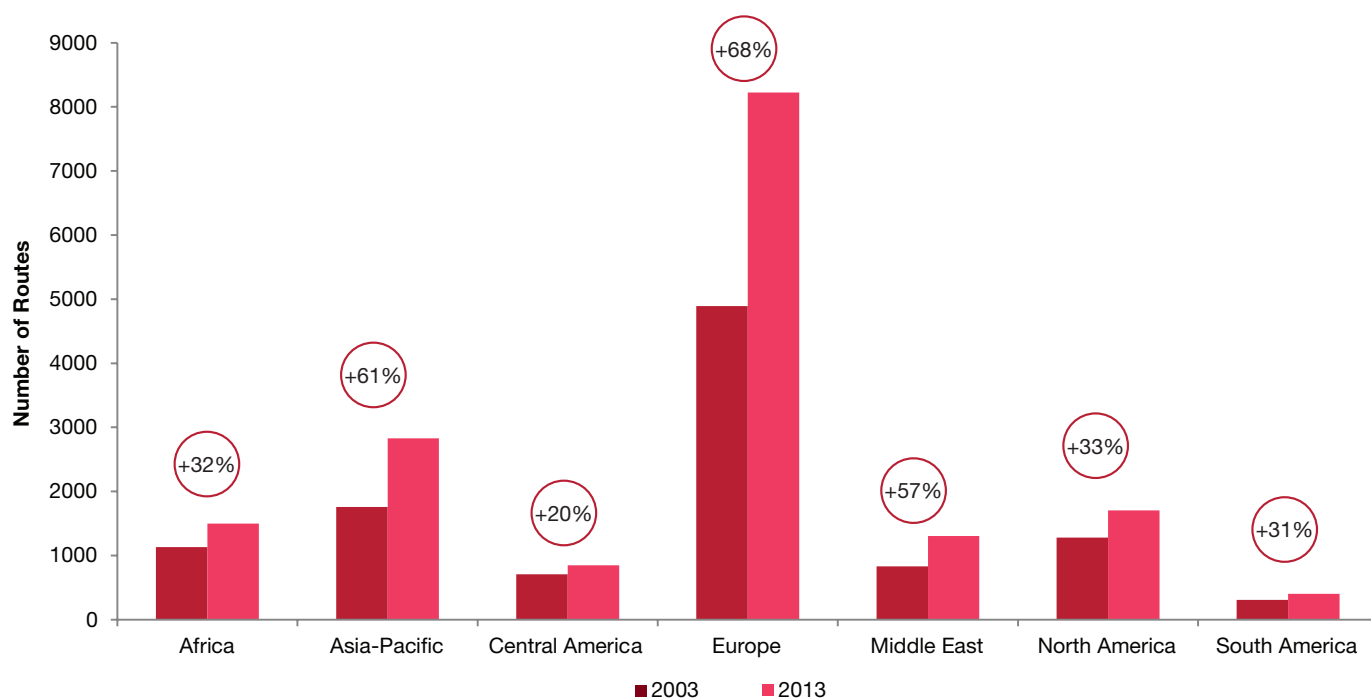
Air traffic growth, which was once led by North America and Europe, is now fronted by the Middle East, Asia-Pacific region and Latin America which have experienced strong growth over recent years. As reported by IATA<sup>2</sup>, in 2013 revenue passenger kilometres (RPKs)<sup>3</sup> in North America and Europe have grown at a rate of 2.2% and 4.0% respectively. On the

other hand, the Middle East, Asia-Pacific region and Latin America have shown growth rates of above 6% per annum, specifically 11.9%, 7.2% and 6.5%. Growth in Africa has also been remarkable with an increase of 5.1% in RPKs since 2012. Most of the growth can be attributed to economic growth as well as to regulatory changes which allow for greater market access.

If we consider the number of direct international routes as a proxy to measure connectivity at a regional level, we can see that a significant increase was observed by the Middle East and Asia, with Europe's routes almost doubling since 2003 as a result of the increased penetration of low cost carriers and the subsequent increase in point to point services.

Assessing direct and connecting passengers further highlights the aggressive expansion of the Middle Eastern hubs, which experienced larger growth in passenger demand than any other region around the world. (See Figure 3.) At the same time, Europe saw strong growth in the number of direct passengers, driven mainly by the significant penetration of LCCs in that market and a subsequent increase in the number of point-to-point services. Asia, Latin America, and Africa have also shown considerable growth, as opposed to the more mature North American market, which has seen a moderate increase in the number of passenger movements.

**Figure 2: Number of international routes by region: 2003 and 2013**



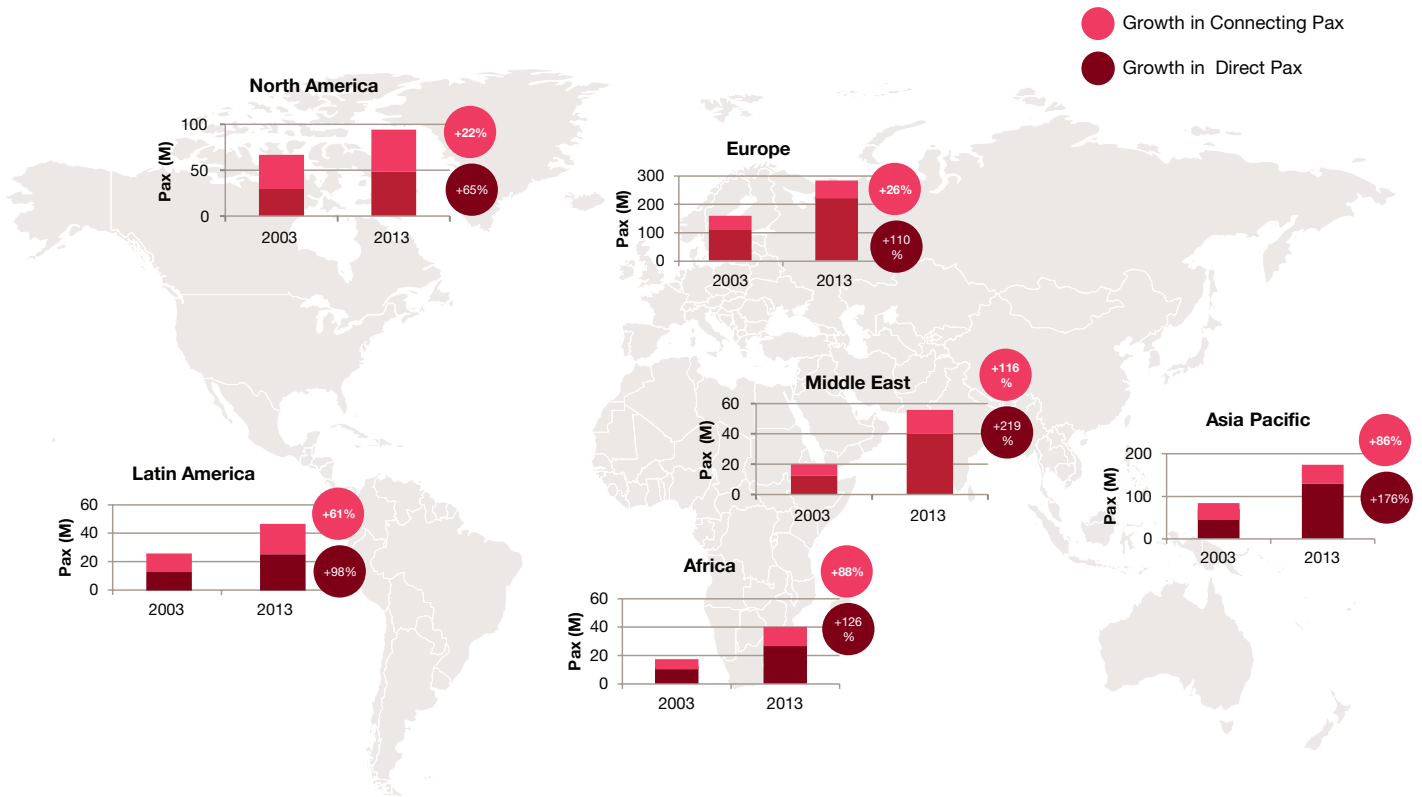
Note: The chart only shows international scheduled routes. Central America is defined as Central America and the Caribbean.

Source: Milanamos, PwC analysis

<sup>2</sup> IATA (06/2014), Fact Sheet: Industry Statistics

<sup>3</sup> RPKs are a common industry measure of air traffic which is calculated by multiplying the number of revenue-paying passengers aboard the vehicle by the distance travelled

**Figure 3: Direct and connecting passenger traffic, 2003 and 2013**



Note: The figure shows the travel patterns of passengers by region. It excludes domestic traffic. Latin America is defined as South America, Central America and the Caribbean.

Source: Sabre/PlanetOptim Milanamos, PwC analysis

### How are air connectivity and economic growth linked?

Aviation generates significant benefits for the global economy. In 2012, it contributed US\$2.4 trillion to the global GDP (3.4%). Direct benefits (i.e. employment and economic activity generated by the air transport industry) are estimated at about US\$606 billion; indirect benefits (generated by employment and economic activity of suppliers of the air transport industry) at US\$697 billion.<sup>45</sup> Aviation also plays a key role

in enabling the economic growth of countries which rely on major hubs such as Singapore and Dubai. In Dubai, for instance, aviation generates about 28% of the city's GDP.

Therefore, we can see how improved air connectivity plays a large role in creating such economic value. Obviously, it benefits travellers by giving them access to a wider network as well as more frequent and better connected services. But it also can strengthen a country's economy over the long haul, boosting productivity through its positive impact on businesses. For example:

- Increased connectivity reduces air travel times, giving businesses access to a wider marketplace.
- Increased connectivity makes it easier for managers and executives to oversee far-flung operations, which infuses efficiency into those operations.
- Better transport linkages enable investment and human capital to flow more freely across borders, improving returns on investment for some projects.

<sup>4</sup> ATAG (2014)

<sup>5</sup> Note: other benefits generated by aviation include induced and tourism catalytic benefits which in 2012 made up for the remaining US\$1,131 billion.

With such insights in mind, PwC conducted an econometric study for the UK Airports Commission. The study used seat capacity as a proxy for air connectivity to estimate the impact of improved connectivity on the UK's economy. The study revealed that a 10% increase in seat capacity could improve:<sup>6</sup>

- **Short-term GDP** by 1%.
- **Tourism** by 4% within the UK and 3% among UK tourists travelling abroad.
- **Trade** by 1.7% in terms of UK product imports and 3.3% in terms of UK product exports. UK service imports and exports would also improve by 6.6% and 2.5%, respectively.
- **FDI** by 4.7% in terms of increased UK FDI inflows and by 1.9% in terms of increased UK FDI outflows.

### **What drives air connectivity?**

Four main factors enable air connectivity: geography, airport infrastructure, airline models, and a country's regulatory and economic frameworks. These enablers all play an important role in ensuring that a country can cement or expand its global air network to enhance air connectivity.

### **Geography**

Air connectivity is especially important to countries with isolated air-travel markets (such as islands and large geographical areas) where passengers have few viable alternatives to air travel. However, a country's geographical location can enhance its ability to develop a well-connected network. Examples include Singapore, Hong Kong, Incheon, the Middle Eastern hubs of Dubai, Abu Dhabi, and Doha, as well as the emerging Turkish hub of Istanbul, all of which have exploited their favourable position in the global air-travel network to build strong hubs with far-reaching spokes.

If we look at Europe, Asia, and the Middle East, we can see how each of these regions has capitalised on its geographical location by capturing intra- and inter-regional flows:

- **Europe** – Within a four-hour radius, the EU's main hubs can draw mainly from European and possibly North African destinations. On longer haul routings, the EU is a convenient intermediate point for (especially) East Coast<sup>7</sup> North American traffic to Asia.

- **Asia** – Asian hubs such as Singapore and Hong Kong have traditionally enjoyed advantages with respect to traffic routes between Europe and Australasia and with respect to other points in Asia where traffic to and from Europe is less developed (such as Indonesia and Vietnam).
- **Middle East** – Within a four-hour radius of Middle Eastern locations lie the eastern parts of Europe and Africa as well as the highly populous markets of the Indian subcontinent. A range of destinations fall within the scope of a 12-hour flight from Dubai, including China, Southeast Asia, Australia, and the vast majority of the African continent. However, the majority of the Americas lie just outside this radius.

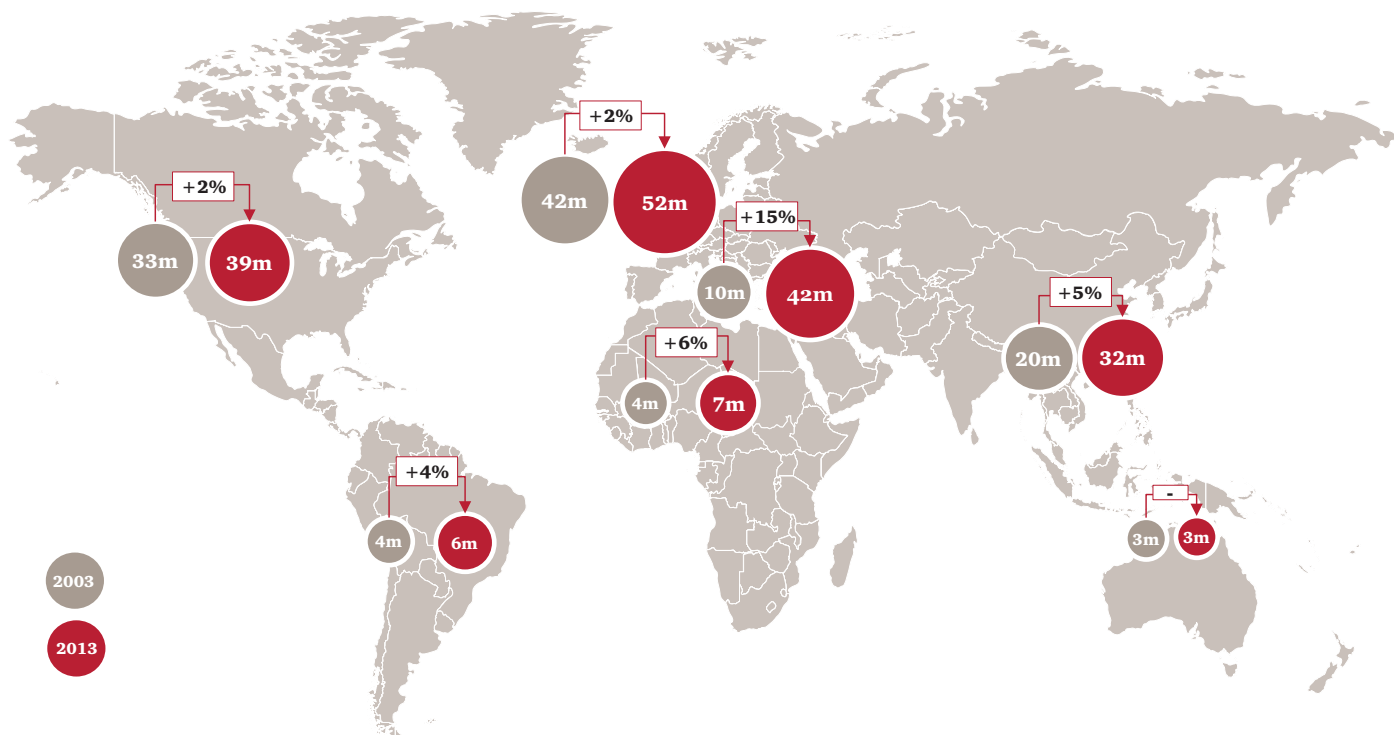
Middle Eastern countries have excelled at marrying a strong national carrier with a route network that supports it by leveraging on the advantage that comes from being located at the mid-point of major traffic flows. Inter-regional transfer traffic at Middle Eastern hubs has in fact grown 15% per year in the last decade – the largest such growth in the world. (See Figure 4.) The strategy adopted by Middle Eastern countries has catalysed development of hub services, which provide passengers with benefits such as more convenient travel itineraries, more frequent flights, and a wider range of destinations available within specific flight times.

<sup>6</sup> Airports Commission (prepared by PwC) (2013), Econometric analysis to develop evidence on links between aviation and the economy, <https://www.gov.uk/government/publications/airports-commission-interim-report>

<sup>7</sup> Although West Coast North America is also within the 12-hour radius of Europe, flights can reach much of Asia direct in the westerly direction.



**Figure 4: Intercontinental transfer traffic**



Note: The chart only shows interregional transfer passengers; it excludes direct passengers between regions as well as any passengers requiring more than one connection and passengers travelling within the region. Turkey has been classified as Middle East.

Source: Milanamos, PwC analysis

### **Airport infrastructure**

Airports provide the connectivity and access required for a modern economy, enabling businesses to capture overseas opportunities and facilitating the coming and going of tourists – all of which fuel economic growth.

Transport infrastructure acts as a facilitator of growth unlocking latent demand. Moreover, enhancement of transport infrastructure, combined with development of an extensive network, can decrease general travel costs for passengers and goods – thanks to lower fares, shorter travel times, and more seamless connections.

Analysis of what’s happening in emerging companies can shed light on the importance of airport infrastructure for improving air connectivity to foster economic growth. For instance, some countries – such as Indonesia, India, and Brazil – have registered brisk growth in recent years (driven by increases in population and economic wealth). But inadequacies in their current airport infrastructure are preventing them from fully capitalising on their growth. Such infrastructure lacks the required capacity, but boosting that capacity will require considerable capital expenditure.

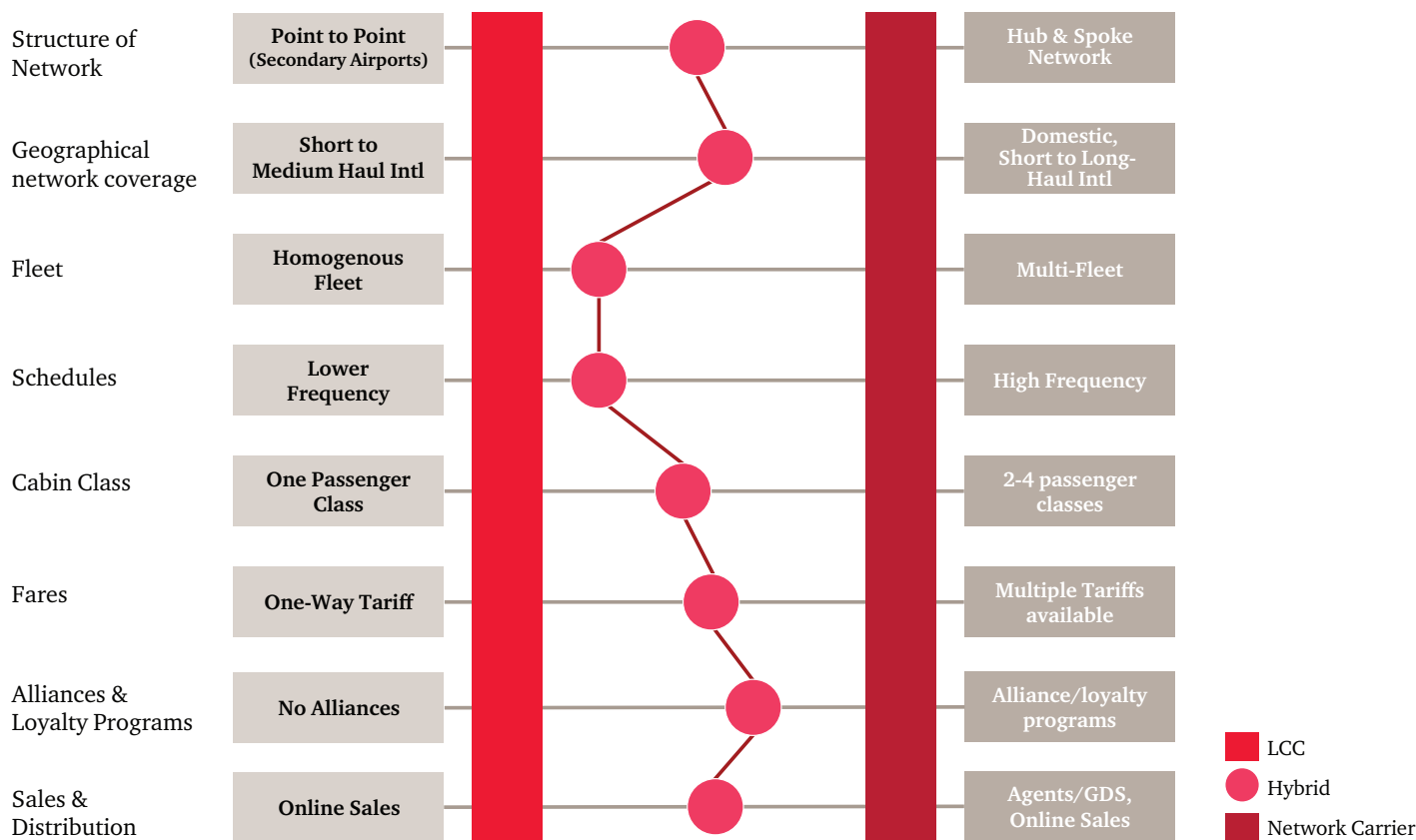
### Airline business models

Airlines' business models can directly affect air connectivity. Indeed, over the past decade, carriers have adopted new models to survive in the face of often unfavourable market conditions. Such models fall into three broad categories: low-cost carrier, network carrier, and hybrid. (See Figure 5.)

In the past, LCCs have targeted mainly the leisure passenger segment. The low-cost model has traditionally provided a 'no-frills' service that can create demand by offering very low fares as well as by serving destinations that were previously not served or only connected via a hub. The availability of low fares has opened the market to a wider group of consumers and has enhanced connectivity by establishing services to and from secondary airports.

Network carriers mainly operate radial networks centred on their main base or hubs. Their networks provide a wide range of destinations and frequent and flexible services that meet the needs of both business and leisure travellers. A hub-and-spoke model consolidates traffic through a hub and allows for lower-density routes to become viable that may not have been viable as a point to point service. This helps to provide a country (or city) with important links and increased frequency of services to the global air travel network.

Figure 5: Three airline business models



With the most recent global financial crisis, many business travellers have gravitated toward LCCs for short haul travel. To capture this new market, some airlines are transitioning to a hybrid model, providing reasonable fares combined with the flexible and frequent service business travellers want.

Countries that can rely on strong network carriers that use their hubs efficiently are more likely to achieve greater air connectivity than countries served only by LCCs. However, this likelihood also depends on what type of air connectivity is central to a nation's economy; specifically, what their leisure and business travel markets want.

### **Regulatory and economic framework**

Public policy and regulation can powerfully facilitate air connectivity – or hinder it by constraining development of a country's air-transport network. Since the 1940s, international air services have been governed by a complex web of bilateral air services agreements (ASAs) between States. Such agreements determine the number of airlines that may compete in any given market, the routes that airlines may operate, capacity (in terms of frequency, and often the number of seats offered) that airlines may provide, and airfares. In recent years, some States have moved to liberalise ASAs; for example, through so-called 'open skies' agreements. Yet despite these open-access models, restrictions remain. Most notably, when it comes to ownership and control of airlines, most ASAs allow governments to reject the designation of any airline that is not owned and controlled by the designating party. For the foreseeable future, the prospect of 'normalisation' of air transport, particularly with respect to consolidation or cross-border mergers of airlines, remains limited.

Governments trying to decide the degree to which they want to liberalise their ASAs would generally take a number of factors into account. For example, a country's geographic features influences the extent to which liberalisation will boost air travel and connectivity. Geography also dictates the features of a country's air-travel market; in particular, whether it is mainly domestic market, an international market, or a transit point for global traffic flows. The attractiveness of the country to tourists and businesses also matters, with population affecting the size of the potential market. For instance, geographically isolated countries may be more likely to see liberalisation as being in their economic interest, especially if they're not attractive to tourists or they don't have the population density needed to build a competitive air-transport network.

Size and geographic location may also influence a government's attitude toward liberalisation of airline ownership provisions. Unfortunately, ownership decisions can't be made unilaterally. Countries need agreement from ALL the bilateral partners who are most significant to their markets – or they risk having airlines with foreign ownership rejected. This is a problem of growing significance for governments seeking fresh capital investment in their airlines. As former flag carriers experience distress, the need to maintain air connectivity will raise new questions about the role of public- and private-sector investment in the industry.

### **How can stakeholders facilitate connectivity growth?**

With the exception of external factors such as geography that are beyond one's control, stakeholders have the ability to influence many of the factors that enable achievement of greater air connectivity. For instance:

Emerging countries can achieve greater air connectivity by:

- Focusing on the development of aviation infrastructure (such as airports) – attracting new investors and ensuring that enough capacity is created to accommodate demand.
- Airlines need to continue establishing and building up their networks to support the linkages a country has with the rest of the world.
- Developing regulatory and economic frameworks which reflect the characteristics and needs of the country, whilst at the same time, fostering air transport growth.

On the other hand, more mature economies will need to focus on sustaining air connectivity by:

- Maintaining the current aviation infrastructure (such as airports) and ensuring any need for additional aviation capacity is promptly addressed to avoid loss of air connectivity to other competing neighbouring countries.
- Airlines should continue to find new routes to enhance their network connectivity which is vital to the success of an airline. These opportunities may be found in emerging markets.
- Mature economies should examine their regulatory and economic frameworks to see that these are continuing to enable growth.

The importance of air connectivity to a country's economic prosperity calls for stakeholders to work together towards ensuring that the right steps are taken to improve or maintain the global position of a country (or city) within the global air network.

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# ***Propensity to fly in emerging economies:***

## **What do the trends mean for aviation infrastructure investment?**

Hayley Morphet and Claudia Bottini

### ***Executive summary***

In markets around the world, changes in propensity to fly affect demand for air travel. And when future demand increases, so does the need for investment in aviation infrastructure. Many investors form their analyses on developed markets and, more recently, the BRICS – Brazil, Russia, India, China and South Africa – when crafting their infrastructure investment strategies. When it comes to emerging markets, the BRICS do call for close consideration. But there are forces at work in several other emerging markets that could present equally attractive opportunities.

Identifying investment opportunities with strong growth prospects requires an understanding of trends in the forces affecting revenue growth – which is driven primarily by passenger growth and therefore propensity to fly. In this article, we aim to build that understanding. Using forecasting and modelling and drawing on our industry and sector knowledge, we analyse how propensity to fly may shift in various emerging markets in the coming decades – and where the most promising investment opportunities may lie in the future.

### ***What influences propensity to fly?***

In any given market, propensity to fly (number of air trips per capita) strongly determines future demand for air travel among business and leisure travellers. The faster the future demand growth, the more urgent the need for safe and efficient airports, reliable transportation and communication networks around airports, and other forms of aviation infrastructure. And the more urgent the infrastructure need, the more opportunities investors have. So understanding how propensity to fly might change in various markets can help investors anticipate where the best opportunities may arise in the future.

But propensity to fly is affected by a lot of different, interrelated forces. An economy's health (and therefore its personal income levels), demographic changes, and the affordability of air travel are just a few examples. To identify the most promising opportunities for aviation infrastructure investing, investors must understand how those forces are changing within particular markets and compare their findings across markets. Many investors are already basing their investment strategies at least in part on their analysis of the aviation markets of the BRICS. But as we'll see, that same configuration of markets may not necessarily present the best opportunities in the future.

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**The more urgent the infrastructure need, the more opportunities investors have.**

With that in mind, let's take a look at the forces affecting propensity to fly. We'll then compare how the most powerful of these forces are changing in several markets. And we'll consider what our analysis suggests about investment opportunities.

## Our analysis

We analysed trends in aviation markets around the globe, with an eye toward determining where the best investment opportunities might arise in the near and long term. Our analysis focused on two factors: compound annual growth rates (CAGR) and correlations between per-capita GDP and number of air trips per capita, taking into account the various factors discussed above.

### Growth in number of air passengers

When it comes to growth in number of air passengers, our analysis of the developed world presented no surprises. Propensity to fly has been increasing rapidly in Europe, owing to deregulation of the airline industry and the increased competition and consumer benefits that have ensued. But it will probably slow in the medium to long term, after the effects of deregulation have worn off and the market has reached a point of saturation. The US has already experienced this pattern.

It's the rapidly developing markets – particularly newly industrialised economies<sup>2</sup> like Brazil, China, India, Indonesia, the Philippines, and Turkey – that are seeing the biggest jumps in the number of air passengers. (See Figure 1.) These countries enjoyed CAGRs of 5-13% between 2007 and 2012.<sup>3</sup>

## Factors affecting propensity to fly

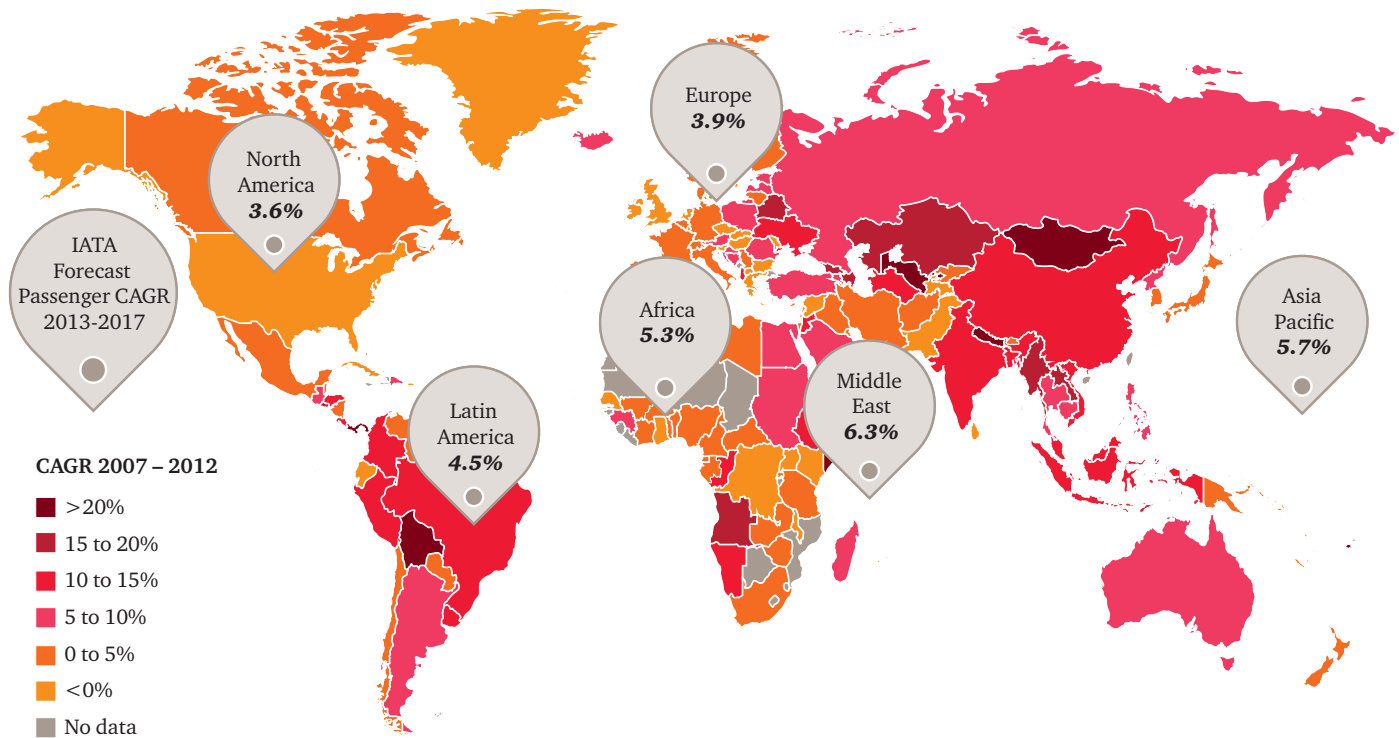
- **Economic health.** Propensity to fly goes up when people have enough personal income to afford vacations and when growth in the overall economy reflects growth in business and therefore the need for business trips. Having enough money for travel requires a strong economy reflected in healthy growth in gross domestic product (GDP).
- **Demographic changes.** A growing population can increase propensity to fly merely by raising the number of people living within a particular economy. An expanding middle class can boost propensity as well, as more and more people have the incomes needed to afford air travel.
- **Market maturity.** As with demographic changes, propensity to fly doesn't increase indefinitely as an economy grows.<sup>1</sup> In fact, it tapers off as a market matures and approaches saturation.
- **Crises.** Unexpected crises, such as the 9/11 terrorist attacks and the global financial crisis in Europe, can temporarily decrease propensity to fly. Following the crisis, propensity can revive strongly in a kind of catching-up pattern after several years of suppressed growth.
- **Geographical features.** Propensity to fly is greater within island nations, countries that are relatively isolated with limited land transport and large distances between population centres, and countries with a long, thin shape, which makes even high-speed rail a challenging option for travel.
- **Competition.** The rise of a new business model in a market – such as low-cost carriers (LCCs) – can increase propensity to fly if it makes air travel more affordable or appealing for consumers and businesspeople.
- **Airport hub status.** Countries with air connectivity far out of proportion to their size, because of their airports' hub status, have a higher propensity to fly owing to the availability of air services. Singapore and the United Arab Emirates are good examples of this.

<sup>1</sup> There's still a limit to how many trips a person can reasonably take in a year, given work and personal commitments. So demographic changes can't raise propensity to fly indefinitely.

<sup>2</sup> As defined by the International Monetary Fund.

<sup>3</sup> IATA 2007–12 – International traffic only.

**Figure 1: Growth in Air Passengers**



Note: Shaded countries represent historical CAGRs for international air passenger traffic. Bubbles represent regional forecast CAGRs.

Source: IATA, PwC

### **Correlations between per-capita GDP and number of air trips**

In addition to analysing growth in the number of air passengers, we looked at the relationship between per-capita GDP and number of air trips. But we qualified this analysis in several ways. For instance, we based our calculations on the number of one-way passengers with the point of sale in a particular country.<sup>4</sup> This approach takes out the impact of disparity between inbound and outbound passengers. Countries with a lot of inbound tourism and a low local resident population show a much higher number of trips per capita,

driven by the economies of the inbound countries. So to keep things simple, we considered only resident travel patterns in our analysis.

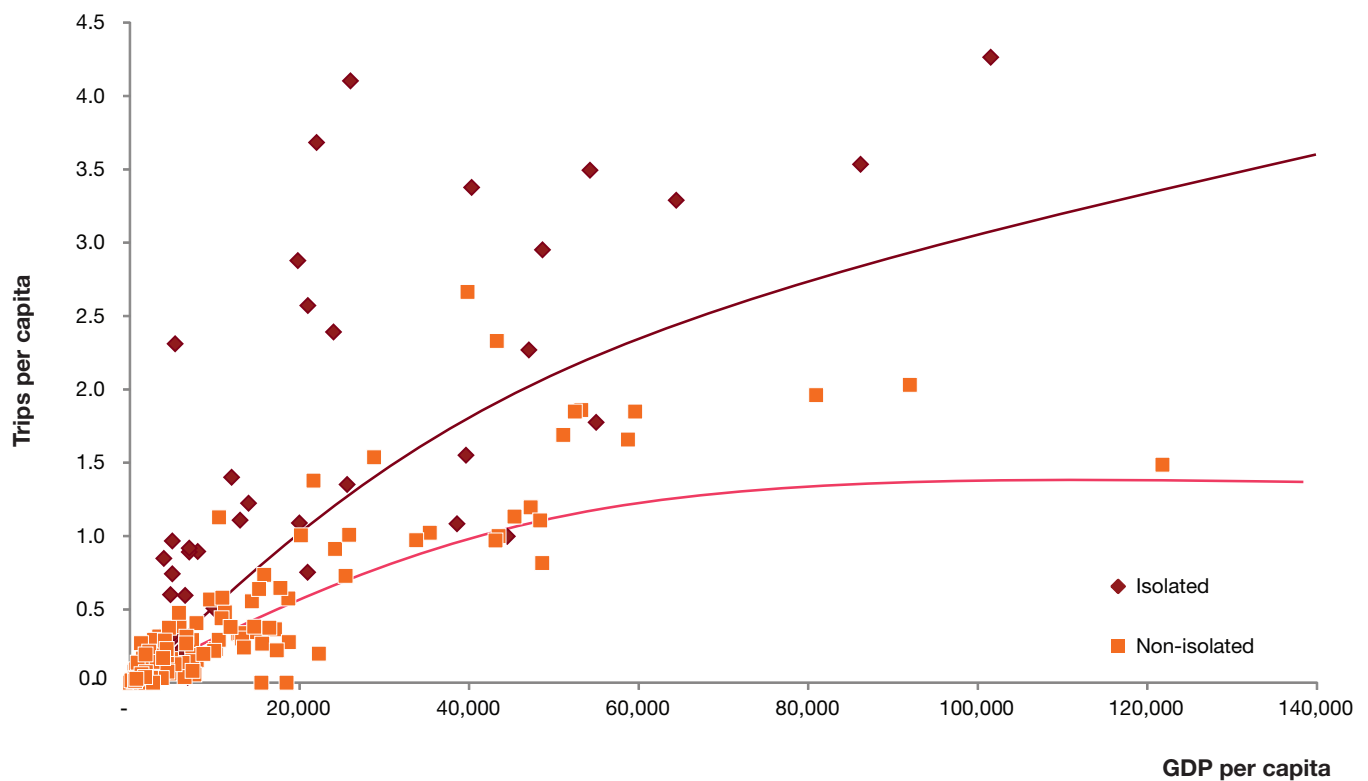
For nearly 200 countries, we plotted per-capita GDP against per-capita number of trips. Collectively, the countries we analysed account for 97% of passenger trips captured in Sabre’s airport data intelligence database.<sup>5</sup> Drawing on the data, we developed a relationship between propensity to fly and per-capita GDP. We took into account market saturation, assuming 2–2.5 trips per capita for non-isolated markets (countries where alternative transport

modes are available) and more than twice that for isolated markets (for example, small island nations, countries where other travel modes are not available or competitive, or countries with major air hubs creating an inflated air travel market due to connectivity). Figure 2 shows that as GDP increases, propensity to fly increases. It also suggests that propensity to fly reaches saturation as GDP rises.

<sup>4</sup> We excluded countries for which economic data was unavailable as well as nations that have low levels of outbound travel because of political or social restrictions. Likewise, we didn’t include countries that have a disproportionate share of outbound passengers and that have incomplete point-of-sale or point-of-origin data.

<sup>5</sup> Though airfares and exchange rates also contribute to the number of trips a person takes, it wasn’t feasible to gather this level of detail for each country. For this reason, our analysis doesn’t reflect these fares and rates.

Figure 2: Relationship between air trips per capita and GDP per capita, 2013



Source: BMI, Sabre Air Transport Intelligence, PwC analysis

### Resident trips per country

We used the relationships derived for isolated and non-isolated markets from the data in Figure 2 to forecast growth in resident trips for 2020 for each country in our study, given growth in per-capita GDP and population over the coming three decades.<sup>6</sup> We then compared these forecasts to resident trips for each country in 2013 and considered how the top 20 rankings might change by 2020. (See Table 1.)

<sup>6</sup> Based on real GDP per capita and population forecasts from Global Insight (August 2014).

**Table 1: Resident trips, 2013 versus 2020**

Ranking	Country (2013)	Resident Trips (m) (2013)	Country (2020)	Resident Trips (m) (2020)	Ranking Change
1	United States	592	United States	636	–
2	China	372	China	525	–
3	Japan	138	Japan	145	–
4	United Kingdom	98	Brazil	118	1
5	Brazil	96	Indonesia	117	3
6	Germany	81	United Kingdom	115	(2)
7	India	77	Australia	92	2
8	Indonesia	77	India	89	(1)
9	Australia	77	Germany	85	(3)
10	Spain	72	Spain	83	–
11	France	64	France	68	–
12	Canada	59	Russia	68	2
13	Italy	59	Canada	65	(1)
14	Russia	54	Italy	62	(1)
15	Turkey	43	Turkey	57	–
16	South Korea	36	South Korea	51	–
17	Mexico	36	Mexico	47	–
18	Malaysia	33	Malaysia	45	–
19	Thailand	32	Philippines	41	2
20	Saudi Arabia	29	Thailand	38	(1)

Note: These figures represent unconstrained (for example, capacity and regulation) forecasts based on 7-year forecast GDP and population projections from BMI. These figures represent indicative air-traffic growth figures based on assumptions and analysis outlined in this paper. No reliance should be placed on these forecasts.

Source: Sabre Airport Data Intelligence, BMI, PwC analysis

## Potential investment hot spots

The upshot of our analysis is that the ranking within the top 20 countries by air trips will change over the coming decade. Our findings suggest that Indonesia, Australia, the Philippines, and Russia will move up most in the ranks in terms of resident air trips. Indonesia is expected to overtake the UK and become the fifth-largest air travel market globally. On the other hand, a recent slow-down in GDP growth sees India losing ground to countries such as Australia and Indonesia. In the following paragraphs, we discuss a selection of markets that present varying levels of opportunity.

### China

To capitalise on forecast growth, the Chinese government is making significant investments to upgrade aviation infrastructure. For instance, mainland China currently has 182 commercial airports. According to the ‘Twelfth Five-Year’ Plan on Civil Aviation Development, by 2015 there will be 82 new construction airports and 101 reconstruction and expansion airports. This is likely to affect investment in infrastructure construction, set as an emphasis investment channel, it is predicted that the fixed investment size will reach more than 400 billion Yuan pre-2015, 60% over the ‘Eleventh Five-Year’ period. By 2030, the number of airports in the country is expected to reach 300.

### Indonesia

Indonesia is currently the world’s largest archipelago and biggest aviation market in the ASEAN group of nations. With a population of over 250 million and the fastest growing economy in Southeast Asia, Indonesia desperately needs additional aviation capacity and infrastructure.

A wide range of opportunities for investment in infrastructure is available. Thirteen airports have been listed for expansion and refurbishment programs, as outlined in the Masterplan for Acceleration and Expansion of Indonesia Economic Development (2011-2025). Additional opportunities lie in the refurbishment of air traffic control assets and ground handling, where the demand for new



equipment will be considerable. Investments by domestic and foreign parties are fully supported by the government in a bid to spur growth.

The operator of Indonesia's Soekarno-Hatta International Airport in Jakarta, the nation's capital, is committing the equivalent of US\$1.24 billion to bring the airport up to date and on par with other major global airports. Soekarno-Hatta was built in 1985. In 2013, it was the world's 10th busiest airport. It's become so overcrowded that it experiences major flight delays at peak travel times, and passengers can expect to wait as long as an hour to claim their luggage after touching down at the airport. The area around the airport has even more problems, including telecommunications difficulties and blackouts. The airport upgrade, which kicked off in August 2012, will be carried out in phases and calls for a new terminal and an extra runway to be completed by 2015.

In addition to development of Soekarno-Hatta, other major airports including Ngurah Rai are currently undergoing major expansion programmes. Whilst existing airport improvements are underway, an entirely new site has been constructed in Medan, about 900 miles north of Jakarta. The New Medan International Airport (Kuala Namu), which with a capacity of 8.1 million passengers per year is the second largest after Soekarno-Hatta International, opened this year in late July. It replaces the existing international airport (Polonia). Airside facilities are controlled by the Indonesian government, and landside facilities are owned by a joint venture with PT Angkasa Pura II,<sup>7</sup> which is expected to provide US\$350 million as an initial investment in return for a 30-year lease. After the lease expires, ownership will revert to PT Angkasa Pura II. The Medan site is to serve as a

regional hub at the same level as Singapore's Changi and Bangkok's Suvarnabhumi airports.

### **Saudi Arabia**

Saudi Arabia has four international and 26 domestic/regional airports. The Kingdom, which is heavily reliant on air travel, is investing significantly in infrastructure projects to accommodate future growth and help to transform Saudi Arabia into an important hub for east-west routes. In 2010, the General Authority of Civil Aviation of Saudi Arabia (GACA) estimated that over the next 20 years, the government will commit at least US\$5.3 billion in the development and revamping of airports. The Saudi market is opening up to foreign investors, as evidenced by foreign organisations managing three of the four international airports in the country.

A consortium led by the Turkish group TAV Airports was awarded the build-operate-transfer contract for Prince Mohammad Bin Abdulaziz International Airport in Medina in October 2011, making it the first airport privatisation deal in Saudi Arabia. The agreement was made between the GACA and TAV alongside partners Al Rahji and Saudi Oger. The consortium will construct a new passenger terminal by the first half of 2015, and will operate the airport for 25 years.

There is private sector involvement in Saudi Arabia's three major international airports in Riyadh, Jeddah, and Dammam. Fraport Saudia Arabia Ltd (a 100% subsidiary of Fraport AG) is responsible for the management, operation, and further development of the King Abdulaziz International Airport in Jeddah and the King Khalid International Airport in Riyadh. Changi Airports International (a 100% subsidiary of

Changi Airports Group) manages King Fahd International Airport in Dammam.

A second tranche of Islamic bonds worth SR15.2 billion (US\$4.05 billion) was issued to further finance the expansion projects of King Abdulaziz International Airport (KAIA) in Jeddah and King Khalid International Airport (KKIA) in Riyadh.

### **The Philippines**

The Philippines government announced a Php 303 million (US\$7.3 million) project to construct, improve, and expand airports in San Vicente, Pagadian City, Butuan City, Dipolog City, Sanga-Sanga, Tawi-Tawi, Cotabato City, and Maasin. In June 2012, the Department of Transportation and Communications (DOTC) invited local and foreign firms to bid for contracts to expand and improve the passenger and airport traffic handling capacity of these eight provincial airports. In 2014 both the US Federal Aviation Administration and the European Union upgraded aviation safety ratings for the Philippines, providing further scope for expansion of international services and further driving the need for expansion in airports and airport infrastructure.

Amongst ongoing projects is the upgrade of Tacloban Airport, for which a budget of Php 2.12 billion (US\$49 million) was approved by DOTC (additional budget, however, may be required for its completion). Following the damage caused by Typhoon Yolanda in November 2013, a runway rehabilitation programme was launched at the airport. During the first phase of the programme, major terminal renovations are being undertaken, while during the second phase, the Civil Aviation Authority of the Philippines (CAAP) will oversee interior redevelopment works and amenity repairs.

<sup>7</sup> PT Angkasa Pura II is state enterprise of the Indonesian Department of Transport that is responsible for the management of airports and air traffic services in Indonesia.

Close-to-capacity facilities at Cebu Airport have also called for the government to tender an upgrade plan for the construction of a new passenger terminal building and the expansion of the existing one. This will increase Cebu Airport's capacity from 4.5 million passengers per year to 8 million per year.

Furthermore, a US\$79.41 million design and build contract for the upgrade and expansion of Puerto Princesa Airport (DOTC) was put to tender in August 2014. The cost of the project was supported by the Export-Import Bank of Korea, from which the Philippines government received a US\$71.6 million loan.

### **India**

Despite the recent slowing of the economy, India remains one of the 10 largest markets globally. The growth in the aviation sector in India requires significant updating of outdated airport infrastructure. There are currently 454 airports and airstrips in India, 16 of them designated as international airports. The Airports

100% foreign direct investment for greenfield airports. A number of other airports have been granted approval to be constructed and financed through public-private partnerships (PPPs).

Given the need to enhance connectivity, the government is planning to build 51 airports over the next few years. Of these, 15 are low-cost airports with construction kicking off in 2013. The investment envisaged for the airports sector is US\$12.1 billion, of which US\$9.3 billion is expected to come from the private sector. These investments will be used for a wide range of infrastructure projects, including the construction of new airports, the expansion and upgrade of existing airports, and the development of low-cost airports. The development of world-class ground handling, cargo, and logistic facilities including high-output distribution centers at major airports, is also expected to require a very significant investment.

In addition, the greenfield international airports at Bangalore and Hyderabad were constructed with financing through PPPs with significant shares of foreign investment. In fact, PPPs enabled modernisation and expansion of the Delhi and Mumbai airports through a transparent competitive bidding process. Other major airports such as Chennai and Kolkata will likely also be modernised through PPPs.

### **Russia**

Strong economic growth is predicted for Russia in the short term. Demand for air travel is set to increase as a result of a growing middle class with willingness to diversify consumption behaviour increasing their propensity to fly.

Russia has 315 airports, of which 64 urgently need upgrades. Most of the airports requiring refurbishment are located in areas where air travel is the only mode of transport available. The government has been injecting cash into regional airports in a bid to attract private investors. However, owing to the size of the airports (often smaller than 1 million passengers per annum), this has been quite difficult.

With Russia hosting the 2018 FIFA World Cup, major development plans are expected for Russian airports, representing an opportunity for investment. One example of such development has been initiated at Moscow's Sheremetyevo airport, where plans aim to raise passenger capacity to 53 million by 2017 and include significant infrastructure investment in sub-runway inter-terminal passenger and luggage tunnels.

## **The growth in the aviation sector in India requires significant updating of outdated airport infrastructure.**

Authority of India (AAI) owns and operates 97 airports. India's government allows for domestic and foreign investors to participate in the development of airport infrastructure at selected airports. In 2013 the limit by which foreign investors can invest in Indian companies was increased to 49% in the aviation market. The government passed a legislative amendment in 2003 allowing the private sector to enter the field of airport development and permitting

Of India's 454 airports, the majority are in Tier 2 and Tier 3 cities. These airports are too small to attract foreign concessionaire interest. As a result, the government has announced during the recent 2014 budget the creation of 200 low-cost airports in such towns and cities to ensure appropriate connectivity, to be funded through PPPs.

## **Brazil**

Many of Brazil's major airports are currently capacity constrained and require upgrading and expansion. Future performance of Brazil's airports is critical, particularly because of the Olympics in 2016 in Rio de Janeiro. In 2011, the government of Brazil decided that private companies would be granted a concession to commercially run some of Infraero's<sup>8</sup> airports to implement upgrades to airport facilities and infrastructure. Current legislation in Brazil does not allow the sale of airport infrastructure; however, the government can grant concessions or perpetual franchises to the private sector for airport operations. The concessions are taking the form of PPPs in which the concessionaire would own 51% of the shares and Infraero would own 49%, therefore holding veto rights on strategic decisions in the joint ventures. In 2012, the semi-privatisation of three of the largest airports in the country, namely, Viracopos International Airport in Campinas, Guarulhos International Airport, and Brasilia International Airport, started to occur, with these airports being auctioned to a consortium of private firms. Galeão International Airport in Rio de Janeiro and Confins International Airport in Belo Horizonte are also set to be partially privatised in a second round of concessions occurring later this year. Infraero has also been investing in facility improvements at these two airports.

Additional potential is identified in retail expansion. In 2011, non-aeronautical revenue accounted for about 32% of total airport revenue, suggesting potential scope for maximising revenue generated

through retail. With traffic volumes expected to increase significantly in Brazil over the next 10 years, Brazilian airports will likely remain attractive to investors.

## **Turkey**

The Turkish economy has grown robustly over the last decade, and its air transport services have developed exceptionally as both its airlines and its infrastructure have modernised successfully. The number of visitors to Turkey increased at an average annual rate of over 10% over the last decade and Turkey saw a huge increase in resident trips due to strong economic growth. New airport infrastructure and Turkish Airlines' aggressive growth have helped drive this development. There has been increased private-sector involvement in airport development since the government enacted a law on the realisation of certain investments and services in the Build-Operate-Transfer (BOT) model in 1994. Such development has focused primarily on Antalya, Istanbul-Ataturk, Izmir-Adnan Menderes, Dalaman, and Milas-Bodrum airports. Turkish operator TAV holdings is the largest airport operator in Turkey and operates airports abroad.

Construction has commenced at a third airport with a final passenger handling capacity of 150 million per year, the largest in the world, in Istanbul, with the goal of replacing Ataturk Airport. The project was contracted using the BOT model. The 25-year tender was auctioned off for euro 22 billion (US\$31 billion) in May to a consortium of five Turkish companies.

Development programs for Turkey's busiest airport, Ataturk, has commenced with initial expansion of aircraft standing and parking facilities. Work at Sabiha Gökçen Airport is also underway in a bid to provide for additional aviation capacity.

## **Japan**

Air traffic growth in Japan is slowing because of Japan's aging population. The resulting decline in population, coupled with slow real growth in GDP, means that propensity to fly needs to work even harder for Japan's air travel market to continue to grow and keep up with other markets. LCCs are beginning to have a presence at Japanese airports, potentially leading to stiffer competition and lower fares, which could increase propensity to fly. This is evidenced by market share claimed by domestic Japanese LCCs, which increased from 17% to 24% of domestic capacity carried between Q4 2013 and Q1 2014.<sup>9</sup> Despite modest growth expectations, Japan still presents an opportunity for investors, as the Japanese government has announced plans to concession up to 27 airports between 2014 and 2019, with New Kansai and Osaka airports opening for concession bidding in 2014. In parallel, the state of Hokkaido has also expressed interest in concessioning its 11 airports. Japanese airports present significant commercial opportunities, as this area has previously been underexploited.

**Japanese airports present significant commercial opportunities.**

<sup>8</sup> Infraero is responsible for operating Brazil's main commercial airports.

<sup>9</sup> CAPA: <http://centreforaviation.com/analysis/japans-expanding-lccs-drive-growth-but-need-cultivating-spring-airlines-and-airasia-re-entry-loom-160039>

## Considerations for investors

We have outlined several emerging markets that will see a major increase in propensity to fly by 2020. Each of these markets needs significant infrastructure upgrading. Such investment may unlock significant economic benefits for a city (or country), supporting an increase in air connectivity through better and more efficient infrastructure. In making investment decisions, investors will want to take into account these markets' unique characteristics, including the regulatory environment and the changing global aviation landscape.

For example, China will see a big jump in air-traffic growth, and (as we noted above) its government plans to invest heavily in beefing up aviation infrastructure. The government is also initiating reforms to raise income levels – including increasing the minimum wage 40% by 2015, expanding the social welfare and health-care system, and promoting labour-intensive service industries. These moves could boost consumption as a percentage of GDP growth. All this suggests that China may represent a good opportunity for investment. But owing to regulations restricting foreign investment, the door isn't necessarily open for outside investors. By contrast, the Indian government allows foreigners to invest

significantly in Indian companies, and prospects look good for foreign direct investment in greenfield airport developments. Thus India's aviation infrastructure may constitute a much better opportunity, at least in the medium term.

Here's another consideration: Developed economies' aviation markets might not look like worthy investment targets because of market maturity and the influx of new competitors from the Middle East, Turkey, and other emerging economies. But that's a surface-level view of the situation. Our analysis shows that these new competitors won't necessarily pose a threat to developed economies in terms of taking away market share. They could actually present an opportunity – for mature markets and investors alike. Why? Their presence will create more inter-airport connections and thus increase cross-border networks. Aviation infrastructure will expand as a result, opening up new opportunities for investors in developed and developing markets.

## Next steps

By understanding trends in the forces affecting propensity to fly and comparing these trends across aviation markets, investors can gain critical insights into where the most promising opportunities may arise in the future. Our analysis suggests that while the US, Europe, and BRICS still merit consideration, a number of additional markets – notably Indonesia and the Philippines – may offer equally attractive potential in the future and thus bear watching. To be sure, other factors – particularly restrictions on foreign investment and appetite for private-sector participation – also play an important role in decisions about where to focus investment. However, propensity to fly can provide some useful insights into a market's potential in the longer term.

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# Keeping airport projects on course in a turbulent world

Pierre-Edouard Pichot and Richard Scott

The developers of airport construction projects on the ground are much like the air traffic controllers managing flights in the sky. They both use modern systems to make sense of the large volumes of data required to keep track of so many moving parts. They still require experience and judgement to make the right decisions in response to minute-by-minute fluctuations and the large-scale disruptions brought by external factors. They need to be ever vigilant and highly flexible to respond to fast-changing conditions. Those traits can save airport developments from flying too far off course, resulting in major delays, cost overruns, and project disputes.

Developers are wise to plan for all these, setting a course secure in the knowledge that they will be able to respond to events and navigate the inevitable turbulence on the way. By embracing flexibility at all stages of the project, they can shape their asset to deliver the value they are looking for, while adapting to present and future market trends.

Unfortunately, many airport developers fail to establish the proper controls over their projects and are thus blind to troubles building on the horizon. They do not fully understand the risks and do not manage them effectively. They miss their chance to avoid disruption by taking early evasive action, and they appear unprepared when struck by events. Without contingency plans, they need a long time to respond. Often, they don't realise the severity of delays and cost overruns until the project is facing serious difficulties.

## **External factors to consider in airport investment**

This is a volatile time for air travel. It is difficult to predict accurately the volume of air travel and passengers' needs 10 years or 20 years into the future. During the construction phase, airports may have to adapt to changes in their mix of airlines, the size and shape of jet planes, and the rapid advance of technology that can affect airport operations as well as passenger behaviours.

Moreover, a particular airport could suddenly face political instability and see a sharp drop in passengers in the midst of a major expansion. Airport developments tend to be highly politically sensitive and attract media attention.

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**Many airport developers fail to establish the proper controls over their projects.**

The risks of veering off course are greater for airports than most big-budget infrastructure projects. Investors willing to put their money into major airport infrastructure need to recognise that such complex efforts are much more than a construction project, where most of the risks can be managed through appropriate procurement, contractual arrangements, and careful planning of the delivery.

As much as possible, investors and project owners should consider external factors that will affect the completed airport. For example, sensitivity of the project to issues such as the home country's GDP and fuel price fluctuations should be factored in during project planning because they could have a major impact on the viability of the project's business case.

It's impossible to plan for unexpected geopolitical risks that could affect trends in the aviation market and industry, but project developers should be ready to make as many adaptations as possible during the construction process. A major devastating event such as the terrorist bombings of the World Trade Center and Pentagon in 2001 and the global financial crisis in 2008 can sharply change air travel patterns and affect airport projects. More recently, the Ukraine-Russian conflict has caused some airlines to alter their flight paths to avoid the fate that befell a Malaysian Airlines jet that was shot down.

Indeed, highly rated Malaysia Airlines, as well as the country's airports, could suffer from public perception, which has suddenly turned quite negative through no 'apparent or proven' fault of the airline or airports.

Malaysia Airlines could face serious financial problems, which may affect the success of Kuala Lumpur International Airport and other Malaysian airports. But there's little investors can do to plan for such dramatic developments.

### **Setting direction with confidence: The business case**

Rigorous scrutiny of the business case provides confidence that an airport is investing in the right project. In developing the business case, investors and airport owners should identify the value they expect, how it is going to be realised, and what the risks are to that value. They should be inquisitive and test the fundamental assumptions and forecasts on which the business case is constructed. They will also need to recognise that the case could be sensitive to factors beyond their control. Once the project is initiated, they should focus on the areas where they can influence the outcome.

With any type of project, the greater the uncertainty about demand and other factors, the greater the risks will be. Given the volatility of air transportation these days, the outlook can be particularly cloudy and add even more uncertainty to an already complex project. So, it's essential that investors and airport owners devote the necessary time and engage with the airport's stakeholders, including regulators, airlines, suppliers, and operators, to help build a business case that's robust and flexible enough to adapt to a future shift in trends, including external factors where they have little control.

Of course, a key factor affecting the business case of any airport is passenger demand. Assumptions and projections need to be tested with various scenarios to validate model projections. Unfortunately, some project owners and investors fail to spend the necessary time to do thorough enough research and consider all of the potential scenarios.

For example, Ciudad Real Central Airport in Spain missed the mark in its projected passenger traffic numbers. The airport opened in 2009 and was intended to accommodate 600,000 passengers annually, providing international service to Madrid via a high-speed rail connection. But the airport attracted only 53,000 passengers during its first year and never reached anywhere near the anticipated capacity, losing several airlines' business and ceasing operations in April 2012.

What went wrong? The airport owners miscalculated a variety of things. The new airport was intended to offer competing service to capacity-constrained Madrid Barajas, but Madrid Barajas' fourth terminal construction project reduced the constraint and hence the reason for Ciudad Real Central Airport's existence.

**A key factor affecting the business case of any airport is passenger demand.**

## Airport operators need to embed flexibility in their plans.

### **Preparing to do the project right – and planning for inevitable changes**

Airport projects are especially complex because they involve such a wide variety of stakeholders and revenue sources. Airport developments also are typically very large in scope and have a long timeline from planning to completion, increasing the likelihood of design and other changes along the way.

Many international airports are intended to be architectural statements in addition to transportation infrastructure. This has been a particular trend in airports constructed in the Middle East. Such unique designs may draw attention, but there can be a tension between form and function, and they are more vulnerable to problems in design and construction because they've never been done before.

A significant challenge for an airport investor is to select a delivery model that allows the transfer of some delivery risks to specialist third parties (designers, contractors, operators), while retaining the ability to respond to changes in the constantly evolving aviation industry. A compromise is often required where the owner retains significant levels of risk and must actively participate in project delivery.

Complexity, novelty, and susceptibility to change are all factors seen in airport projects. Successful airport development therefore demands the highest standards in project management and control. The delivery

organisation and processes need to be carefully planned from the outset to create proper oversight, communication, and control. Significant issues need to be identified and escalated so that action can be taken quickly when risks of delay and cost overrun surface. This increases the likelihood that an airport development effort will stay on course and be flexible enough to respond to any turbulence.

### **Getting projects back on track**

Scope change is the one sure thing to count on with an airport construction project. Airport operators need to embed flexibility in their plans. They should agree up front with designers, contractors, and stakeholders that there will most likely be changes along the way because of fluctuating market trends. They must be prepared to reassess the business case frequently to take advantage of the opportunities that change brings as well as mitigate the risks.

London's Heathrow Airport designed its new Terminal 2 to be a home for the Star Alliance airlines and reduce transfer times to improve the passenger experience. But during construction, some of the fundamental assumptions of the terminal operation were tested by the sale of BMI, the carrier with the largest presence in the terminal, and its integration into British Airways. Fortunately, strong project controls allowed changes to be made even late in the construction programme to accommodate a new mix of carriers – within the budget and without affecting the opening date.

Airport developers must identify risks, assign them appropriately, set up controls for their own risks, and monitor the risks they have transferred to contractors or other parties. Where risks or new requirements materialise, integrating teams with representatives of all key stakeholder groups can help project leaders respond in a considered manner, balancing immediate action with the need to maintain the momentum of project delivery.

Changes in the midst of construction, of course, are much more expensive than incorporating the features in the original design. Qatar's new Hamad International Airport was delayed in part because of changes and expansion. The Associated Press estimated that the price tag had grown to at least US\$15 billion by the time the airport opened for business in 2014.

Airport developers need to evaluate any project changes and approve only those they consider truly necessary. If they decide they need a larger airport as they proceed because of changing market conditions, they must closely examine the implications for revenue, maintenance costs, and other expenses.

The contractor and designer should be given adequate time to come up with the most appropriate response. The solution chosen might not be the most economical, but it may be the most efficient to respond to the future, maximising the value to be delivered by the project in the long term. A successful delivery plan will allocate power to the right people to make the right decisions with a long-term objective in mind.

To minimise expenses, airport designers are advised to build in as much flexibility as possible. If they use modular design, they can move or knock down walls to change configurations. Such a simple adjustment could provide more room for baggage claim, for instance, if passenger traffic suddenly rises and there is need to take space away from another area, such as duty-free shops. Flexible design also could allow terminals to more quickly add parking slots for planes or make modifications to accommodate larger or smaller planes.

### **Learning from the past**

While successful delivery of modern, complex projects is supported by powerful data analysis and systems, experience is irreplaceable. Some airport owners have learned from mistakes to keep future projects on course. For instance, London's Heathrow Airport and British Airways experienced multiple problems with their Terminal 5 opening, but Terminal 2 had a much more successful opening a few years later.

Among other things, Heathrow and British Airways failed to do adequate testing before opening Terminal 5, resulting in numerous problems. The airport and airline were also too ambitious in trying to open on Day 1 at near-full capacity. On opening day, 34 flights were cancelled and baggage check-in was suspended. On the second day, 42,000 bags were not shipped with their owners. Within five days of opening, more than 300 flights were cancelled.

Six years later, when planning the opening of the new Terminal 2, Heathrow's owners made several operational decisions to make the opening as smooth as possible. While Terminal 5 opened at near-full capacity, Terminal 2 opened operating at 10% capacity with only 34 flights on the first day. And unlike Terminal 5's plans to move British Airways' operations to the terminal very quickly, Terminal 2 housed only one Star Alliance airline on opening: United Airlines, with Aer Lingus, Air Canada, Lufthansa, and other carriers moving operations over during the remainder of 2014.

### **The importance of getting airport projects just right**

An airport is usually a landmark for a region, a country, or a continent. It is the first point of entry to a new territory, a true gateway to a new culture – and first impressions last.

So, it's critical to try to get airport projects right despite the uncertainties of today's air travel environment and the complexities of such projects. How many passengers complain about queues at customs or time to walk to the gate? And this is the first memory of their trip.

Such issues could easily be resolved with adequate planning and project management. Designing and constructing airports require careful long-term thinking and integrated planning with flexibility embedded at all stages of the project.

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**It's critical to try to get airport projects right despite the uncertainties of today's air travel environment and the complexities of such projects.**



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# ***Airport infrastructure in Asia***

## ***Coping with the demand surge***

Edward Clayton

### ***Executive summary***

Asia's rapid growth in the commercial aviation sector in recent decades has positioned the region as the largest and fastest growing in the world. The growth in Asia is expected to remain resilient, forecast to continue as the world's highest growth region well beyond 2020<sup>1</sup>. However, aviation infrastructure is not keeping pace with this growth. Many of the Asian hubs are already operating above their planned capacity, resulting in a rapid escalation of delays since 2010. Current plans for constructing mega-hub airports are not effective from a cost perspective and will fail to keep up with demand. Instead, governments should plan larger numbers of medium-sized airports to keep costs manageable, gain maximum operational efficiency, and build a wider aviation network, allowing Asian commercial aviation to continue in its role as a key enabler of economic growth.

Airport operators and governments in Asia are competing to build the world's biggest airport, with capacities well in excess of 100 million passengers per annum. However, our experience is

that owing to exponentially increasing complexity, airports suffer from significant diseconomies of scale above around 50 million passengers per annum, both for the airport operator (Capex and Opex) and for the airlines and passengers using them (time to move around the airport). At the same time, the network benefits of these very large airports do not increase as fast as their size. Therefore, Asian airport planners and operators will need to acquire capabilities in multi-airport systems – or radically change how airports operate to overcome the inherent scale diseconomies of mega-hubs.

### ***Asia as a high-growth region***

In recent decades, Asia has emerged as the leading region in aviation traffic, currently accounting for 30% of the world's revenue passenger kilometres, up from 24% in 2004. As the world's fastest growing region, Asia should see its growth remain resilient at over 6% per annum over the next two decades<sup>1</sup>. In contrast, established regions such as Europe and North America are expected to experience relatively slower growth, with opportunities scarce due to market maturity, environmental concerns, and increasing availability of substitutes such as high-speed rail.

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**The growth in Asia is expected to remain resilient, forecast to continue as the world's highest growth region well beyond 2020.**

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<sup>1</sup> IATA

Asia's surge in demand for airport infrastructure is explained by three factors: liberalisation of the Asian markets, growth in wealth and size of the Asian middle class, and a lack of alternative modes of transport.

Since the 1980s, the opening of formerly closed countries in Asia to global trade has massively stimulated the movement of both goods and people in the region. Free trade agreements (FTAs) have driven the convergence and integration of economies within Asia, stimulating intra-regional trade. Concurrently, Asian countries have liberalised visa requirements and air travel agreements. For example, the ongoing programme of ASEAN air services liberalisation has already resulted in significant increases in flights between capital cities, and should enable the opening up of many secondary airports to intra-ASEAN flights in 2015.

In combination, the liberalisation of Asian economies and travel restrictions has opened travel opportunities to new population segments, many of which were previously unable to travel by air.

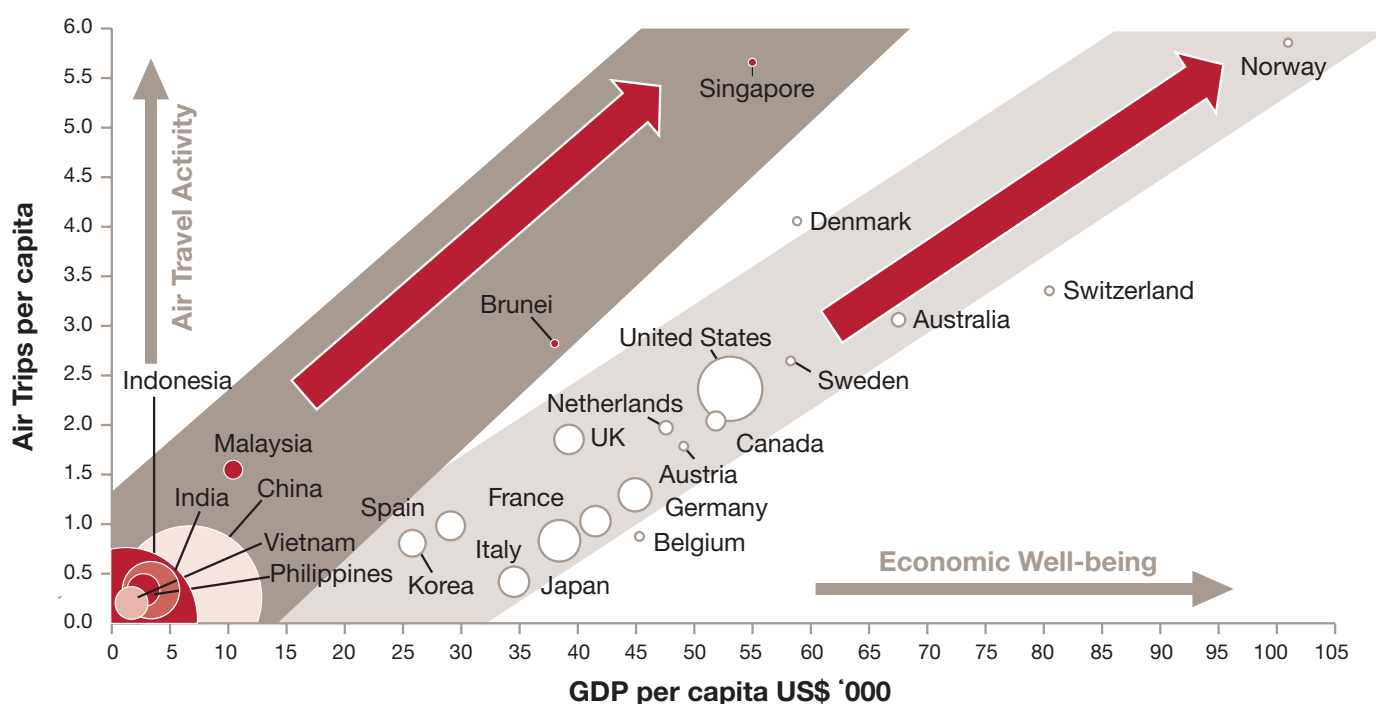
Asia already has the largest share of the world's urban population in its cities; this is unleashing a massive wave of new travel. The reasons are simple: people migrate to centres where they can earn higher wages; they can then travel owing due to the availability of airport infrastructure in proximity to such cities. They also have the motivation to do so, in many cases for visits to their home towns but also for tourism. Asia is rapidly becoming a higher income region, and is already home to 41% of the world's middle class. This percentage is predicted to rise to 68% of the world's middle class in 2033, owing to an

expected four-fold increase in absolute numbers of Asia's current middle-class population.

Empirical evidence shows that the propensity to travel increases with the economic well-being of the country. (See Figure 1.) However, upon further inspection, the trend points toward an even more compelling case for the growth of air travel in Asia. At similar levels of economic well-being, Asians take more trips than the Europeans and North Americans who adopted mass air transport far earlier than Asians.

One reason for this is the lack of alternative modes of transport. Unlike in Europe and North America, where large contiguous landmasses allow intercity highways and railways, large parts of Asia can be reached only by air. Geographical barriers include mountainous

**Figure 1: Air-travel activity versus economic well-being**



Note: Air Trips per capita is calculated as number of departing passengers divided by total population.

Source: The World Bank, Strategy & analysis

regions, the island nature of much of Southeast Asia (the Philippines, Indonesia, Malaysia, Brunei, and Singapore), and sheer distances between major Asian cities. Although high-speed rail is now well developed in parts of North Asia, for much of the continent, air travel will remain the best option from a cost and time perspective for the foreseeable future.

To fully respond to this demand, Asia's current aircraft fleet has to grow rapidly. This equates to an estimated 13,000 new aircraft deliveries in the next 20 years, more than doubling the size of the current fleet. So, the question remains: How can a region set to lead the world in terms of aviation traffic and size of fleet accommodate its growth?

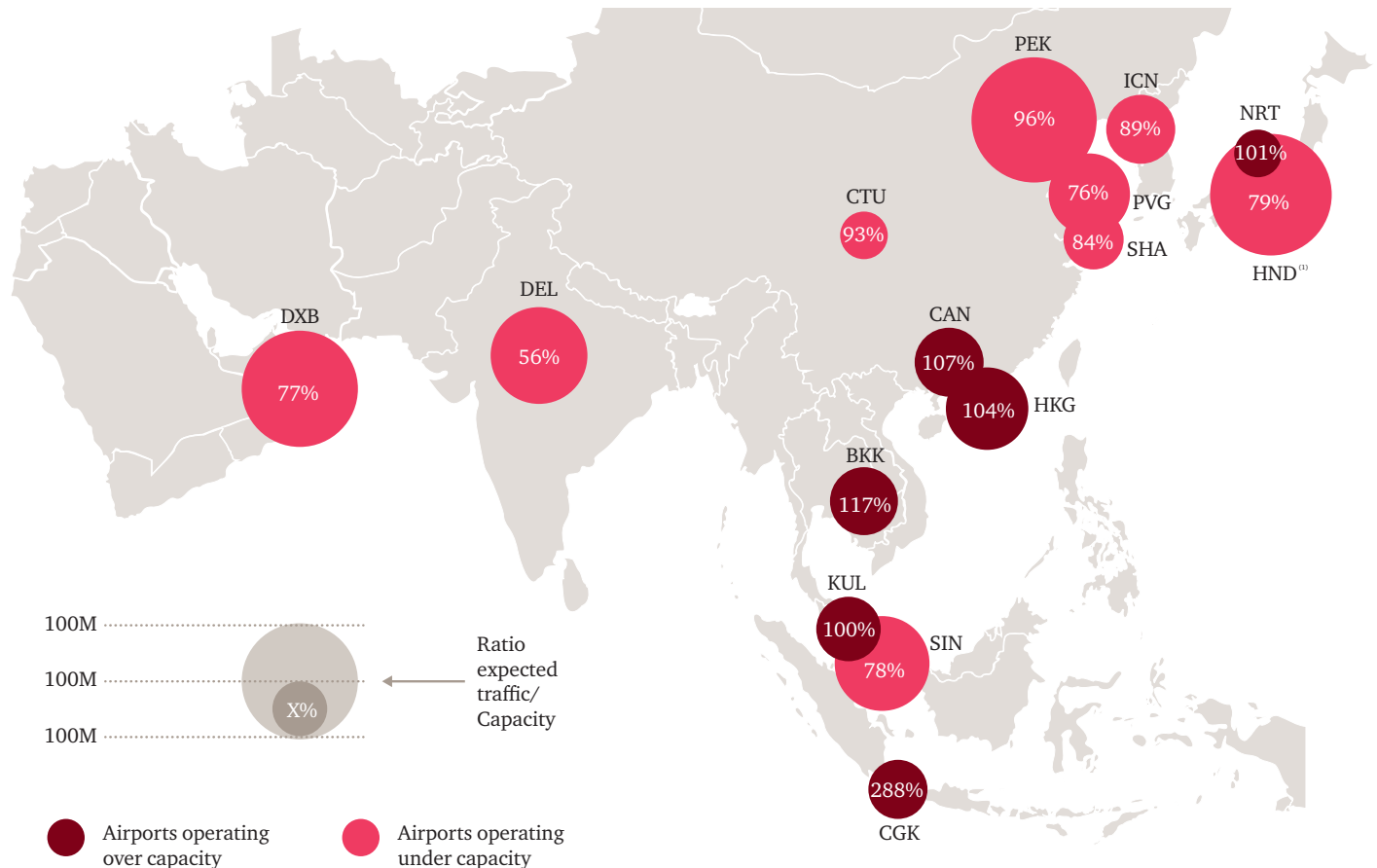
## Asia's current aircraft fleet has to grow rapidly.

### Current observations in Asia

Development of Asia's airport infrastructure has lagged behind travel growth. Traffic at most major Asian hubs is already exceeding planned capacity whilst even secondary hubs are starting to experience capacity strains. (See Figure 2.) Since the large surge in Asian airport developments in the 1990s, infrastructure has rarely been built ahead of demand. This is a cause for concern, owing to Asia's predicted high rate of growth and given that runway and terminal projects typically require 5-10 years from need recognition to implementation.

As a consequence, congestion-related delays are rapidly increasing at most Asian hubs. Passengers experience increasingly common flight delays, long queues for take-off, and circling of aircraft in stacks prior to landing. Availability of suitable landing and take-off slots is suddenly becoming scarce, leaving airports unable to cope with any further growth, and leaving airlines with nowhere to operate their newly delivered aircraft. Therefore, it is not surprising that in 2013, only 57% of departures from Asian airports were on time. This number is considerably lower than for airports in North America and Europe, which boast 79% and 73% of departures on time, respectively.

Figure 2: Passenger capacity of Asian hubs in 2012



Source: IATA PaxIS, Strategy& analysis

Specifically, in 2013, less than one third of the flights from China's three largest airports departed on time. And even Changi International Airport and Incheon International Airport, both award-winning and highly rated, were not able to match North America's average percentage of on-time departures.

When we look more closely at the demand patterns, we see some major issues that have exacerbated the problem:

**1. Liberalisation and the growth of LCCs has led to smaller aircraft being deployed:** Historically, Asian airlines operated large aircraft with relatively low frequency between capital cities. Most of the growth in the past decade has been in narrow-body flights, reducing the ratio of passengers per runway slot.

## In 2013, only 57% of departures from Asian airports were on time.

**2. Rates of commercial aviation growth have been higher than forecast:** Despite various set backs such as SARS, the 2008 GFC, and political issues in some countries, aviation in Asia has grown faster than forecasters of the 1980s and 1990s expected.

However, looking beyond the demand for flights to the supply of infrastructure, we can see that Asia has developed its airports in a very different way from the rest of the world.

As a region, Asia has just 0.22 airports per million inhabitants; the least of any region in the world. (See Figure 3.) However, these airports serve an average of 1.75 million passengers, well above the mature aviation markets of North America and Europe.

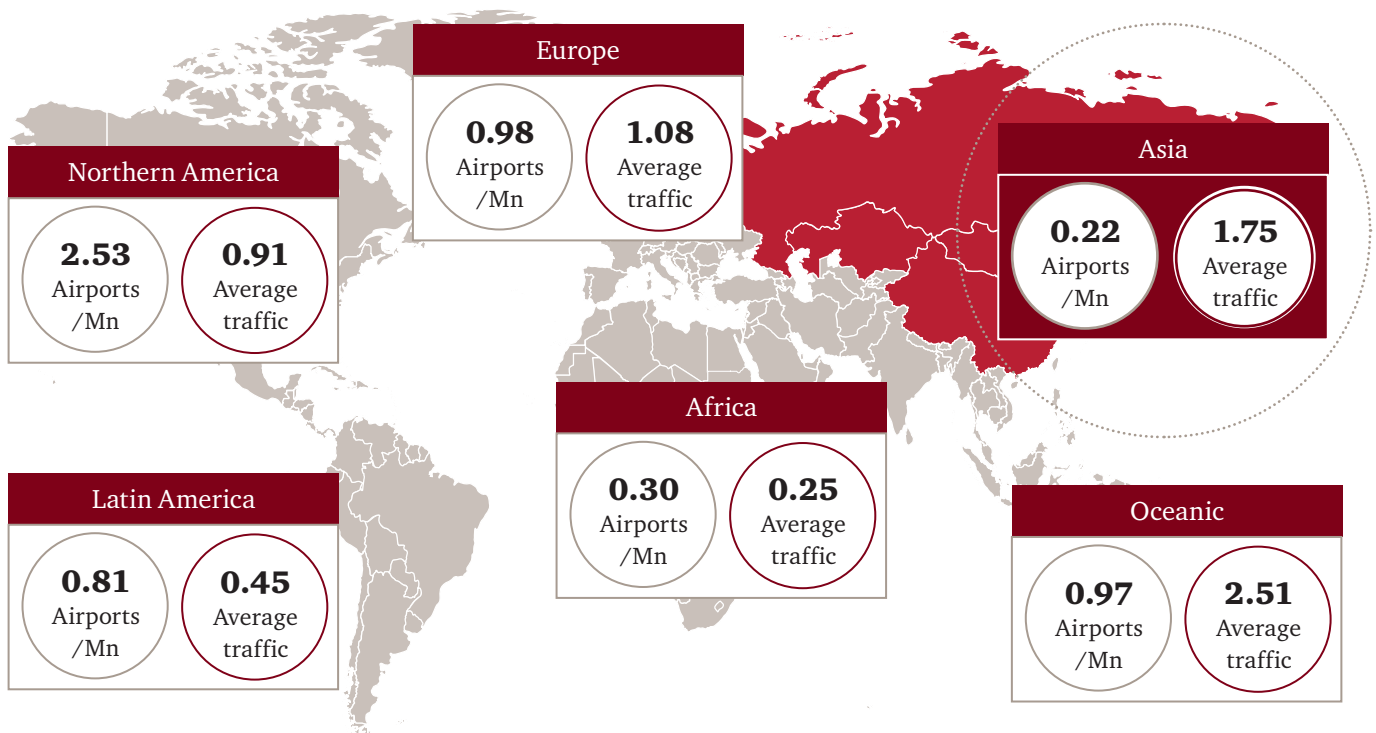
Bearing in mind that Asia's main hubs are already under capacity despite being among the largest in the world, it's clear that Asia has too few airports, and the inefficiencies of larger-sized airports is leading to increasingly frequent delays.

### Moving to a better travel world

#### Building mega-hubs

Several mega-hub projects have been announced and are set to come into service in the next decade. Such projects include the Al Maktoum International Airport, Beijing Daxing International Airport, Hong Kong International Airport's Three-Runway System, and

Figure 3: Airports per million inhabitants and average airport capacity in 2013



Note: The definition of 'Airports' refers to facilities with a paved runway of at least 5000ft (1,500 metres) in length and has scheduled passenger service on commercial airlines.

Source: The World Bank Group, OAG, Airbus, Strategy& analysis

Changi's East extension. When finished, each of these is planned to have a capacity of more than 100 million passengers per annum.

When we study growth trends amongst airports globally, we find that the largest airports have experienced slow rates of growth, appearing to hit a growth wall at the 80-100 million passenger level, while the second tier of large airports continues to grow rapidly in terms of passengers served. Given the current inability to manage large Asian hubs efficiently, and the evidence from other regions that airports typically do not grow indefinitely, constructing even larger airports may not be the best approach moving forward.

### **Optimizing airport size**

An alternative approach involves the construction of a larger number of optimally sized airports, sufficient as a whole to handle the growth in demand – despite being smaller than mega-hubs. The rationale behind this approach rests on three pillars:

- Delivering airport infrastructure that is cost-effective and efficient, potentially introducing competition for the provision of airport infrastructure
- Providing airport accessibility to a larger percentage of the population, as more airports inevitably means a larger population lives within easy surface-travel distance
- Improving the quality of travel and reducing congestion and delays, during normal service and by delivering redundancy in the event of unplanned incidents

This approach is not entirely new; more than 70 cities globally (including London, Paris, New York, Chicago, and Sao Paulo) are already being served by more than one airport, with just 15 such cities in Asia (such as Kuala Lumpur, Bangkok, and Manila). Regardless of the reasons for multi-airport cities,

## **Asia's main hubs are already under capacity despite being among the largest in the world.**

the benefits appear clear. Operating several smaller airports is very different from operating a mega-hub with capacities exceeding 100 million passengers per annum, both in magnitude of costs and ease of achieving operational efficiency.

### **Managing multiple airports**

The notion of having multiple airports serving a city, raises several concerns:

- In some cases (such as Singapore and Hong Kong), it is extremely hard to find space in the city for more than one airport. In these situations, airports in neighbouring territories can provide an alternative (for example, Johor Bahru for Singapore, and Shenzhen, Macao, and Zhuhai for Hong Kong).
- To avoid transfer passengers having to move between airports in a multi-airport city, airports should be planned so that a single airline or alliance can be accommodated in a single airport; transfers between non-alliance airlines are rare.
- Private airport operators may not wish to see a competing airport in the city. It is therefore essential that prior to privatisation, clear policies on multi-airport development are laid out so that the operator has certainty when making the privatisation investment.

### **Conclusion**

Our recommendation is that government policy makers and planners in Asia consider moving beyond simply considering the provision of capacity to meet demand, and instead think through the options for providing a cost-effective travel experience for passengers. Such options should take into account surface travel distance

to the airport, time spent navigating the airport (kerbside to aircraft), and operating efficiencies that airlines gain with shorter taxi distances from runway to gate as well as slots that are available to suit passenger and airline schedules. Our expectation is that airports with terminal capacities of 20-25 million passengers and runway capacity of around 50 million passengers (twin independent parallel runways) will give the optimal combination of scale economy whilst allowing the majority of passengers to travel on point-to-point flights. As such, governments should plan to construct more optimally sized airports with capacities of 20-50 million passengers per annum, rather than mega-hubs exceeding 100 million passengers. In this way, they will stand a better chance of meeting Asia's growing demand in a way that enhances air connectivity and improves the quality of travel.

**Note:** We have not addressed air cargo in this paper. Because of its nature, air cargo tolerates much longer journey times to airports, and therefore different scale issues arise.

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# *Has the trend line shifted?*

## The impact on airport valuations

Romil Radia, Funminiyi Oduko, and Robert Behan

### **Executive summary**

The last year has continued to see transactions taking place in the UK airports' sector, including OTPP increasing its shareholding in Bristol Airport to 100% and Heathrow Airport Holdings (HAL) announcing the sale of its interests in Glasgow, Aberdeen, and Southampton airports. This followed an active 2013, which saw Manchester Airport Group's (MAG) acquisition of Stansted Airport and other transactions in UK regional airports. In addition, there have been numerous European airport transactions, namely the sale of Hochtief's airport division to PSP Investments and TAV Airports' acquisition of a stake in Sabiha Gokcen (Istanbul) from Limak Group. These transactions and other anticipated transactions across Europe in the near term demonstrate that there is strong ongoing interest in the airport sector. Understanding individual airport value drivers and associated risks remains key to securing a good deal.

Airports are a unique class of asset. While they have historically enjoyed a moderate degree of cash flow certainty, they have also offered greater potential for growth than more traditional infrastructure assets.

### **A unique asset class**

In the mid to late 2000s, against a backdrop of greater availability of credit and sustained passenger traffic growth, we saw enterprise value to

earnings before interest, tax, depreciation, and amortisation ('EV/EBITDA') transaction multiples for European airports at or above 25x. Passenger traffic growth forecasts at the time of these transactions indicated expectations for continued traffic growth from an all-time high.

But unlike more traditional infrastructure assets, airports serve airlines as their primary clients and therefore share in the fortunes and woes of a highly cyclical industry. Airport valuations are predicated on expected future cash flows, which are in turn underpinned by passenger demand for travel.

Despite the resilience of airport cash flows in the previous economic downturns, the onset of the global financial crisis led to lower passenger traffic and revised growth expectations. Downside valuation risks for airports became apparent. These risks were subsequently borne out by airport transaction multiples observed since 2008, which, on average, declined in line with traffic growth expectations.

This article explores the trends in UK passenger growth and the movement in EV/EBITDA transaction multiples for airports over time. It also highlights airport valuation drivers and risks. Finally, we identify considerations important for investors to take into account when valuing airports.

## Today's market is characterised by modest growth expectations and significant short-term uncertainties.

Today's market is characterised by modest growth expectations and significant short-term uncertainties. For this reason, we do not for the moment expect to see a sustained return to EV/EBITDA transaction multiples of more than 20x for European airports last observed in the mid to late 2000s.

Instead, airport transactions in the past five years indicate that regional airports with higher traffic growth transact within a range of between 14 to 18 times EV/EBITDA, and larger, more mature airports transact within a range of 10 to 14 times EV/EBITDA. To date, apart from transactions characterised by government or local authority intervention, there has been limited evidence of transactions in underperforming airport assets.

For airports that would currently fall within the respective 10 to 14 times and 14 to 18 times EV/EBITDA ranges, once there is greater visibility around the strength and pace of

traffic recovery, nothing precludes observing the higher level of multiples again in the medium term, if there are asset-specific reasons to justify this.

### **Airports: a very current valuation topic**

Airport transactions continue to hit the headlines: MAG acquired Stansted concurrently with Australian infrastructure fund IFM's purchase of a minority stake in MAG in January 2013; Canadian pension fund PSP acquired the airport portfolio from Hochtief group in the third quarter of 2013. In addition, the Spanish public body Aena acquired Luton Airport from Abertis in August 2013. Deal activity is likely to continue in the UK (witness HAL's recent announcement of the sale of its interests in Glasgow, Aberdeen, and Southampton airports) and European markets into 2015.

Given current sovereign debt burdens across Europe and the need for investments in key transport infrastructure in the emerging markets, partial or full privatisation of state-owned airports may remain popular (examples include the partial privatisation of AENA and sale of a number of Greek airports, both likely to be completed by 2014/early 2015). Furthermore, the uncertainty in economic outlook across the world makes airports a relatively attractive asset class to invest in.

### **Uniquely appealing assets**

Many investors see airports as relatively safe assets. That is because airports typically offer stable cash flows with the potential to realise significant capital gains on disposal. Indeed, having at times enjoyed traffic growth rates in excess of two times GDP growth, listed European airports, on average, have continued to outperform the Eurofirst 300 index over the last six years. (See Figure 1.)

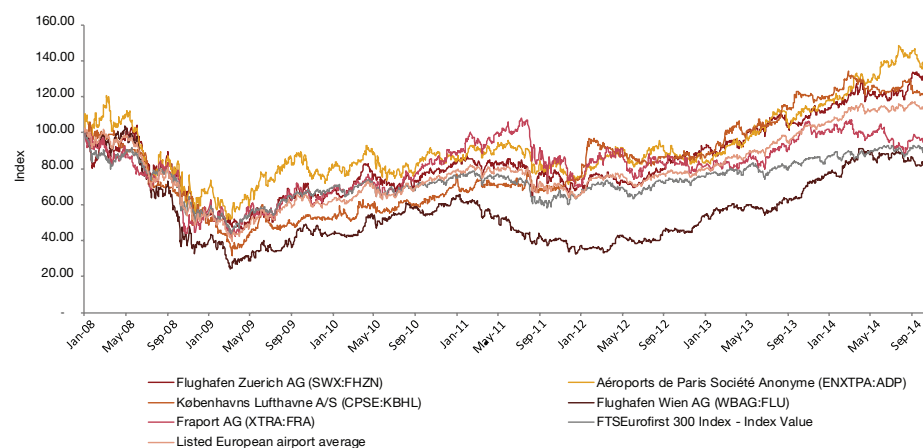
Even when air traffic falls during economic slowdowns, airports can still deliver growing dividends to investors through the deferral of operating costs and rescheduling or reducing capital expenditure.

### **Airport investors**

Financial investors in airports such as infrastructure or pension funds are interested in the stable cash flows airports offer. And they often invest with their eye on the long term. Many focus on the internal rate of return (IRR). They also try to enhance value by implementing optimal financing structures.

Trade buyers (such as other airport operators) try to improve operational efficiencies; for example, by increasing commercial yields and by expanding the airport's route network. We are observing an increasing trend of airport operators forming consortia with financial investors with the aim of boosting value through operational and financial structuring improvements.

**Figure 1: Listed European airport share price performance**



Source: S&P Capital IQ

## In the case of airports, a primary driver of earnings growth potential is passenger growth.

The key messages arising from this paper are relevant and applicable to both trade and financial investors.

### UK traffic: Reversion to trend?

#### Tracking growth against the trend

Figure 2 shows UK terminal passenger traffic ('pax') since 1976, with the long-term passenger growth trend superimposed.

The graph shows that, up until 2008, it typically took 4-6 years for traffic to return to the long-term passenger growth trend following a recession or other economic shock.

Thanks to these patterns, it has often become conventional wisdom that traffic growth and associated airport cash flows will revert to the long-term trend after a shock rather than grow at a similar rate from a lower base. Indeed, between the late 1990s and mid 2000s, UK traffic saw significant growth above the long-term trend. This was fuelled by a sustained period of economic growth, greater availability of credit, and the emergence of low-cost carriers (LCCs).

#### Growth expectations and transactions

Figure 3 shows actual UK passenger traffic alongside UK traffic expectations in 2007, the last full year prior to the global economic crisis.

In 2007, the expectation was that UK airport traffic would continue growing from its 2007 peak at a rate broadly in line with the long-term growth trend. With hindsight, it is clear that 2007 passenger growth expectations did not materialise.

Take a look at the EV/EBITDA multiples between 2000 and 2014 for European airports in Figure 3.<sup>10</sup> Of course, there are obvious challenges in comparing transaction multiples between airports owing to each airport's specific operations and individual growth potential. However, it is fair to say that, on average, airport transaction multiples rose in the early to mid 2000s, peaking around 2007 and, on average, have fallen since.

Perhaps unsurprisingly, passenger numbers in the UK have seen a similar pattern. The upshot of this analysis is relatively straightforward: at a basic level, transaction multiples are a

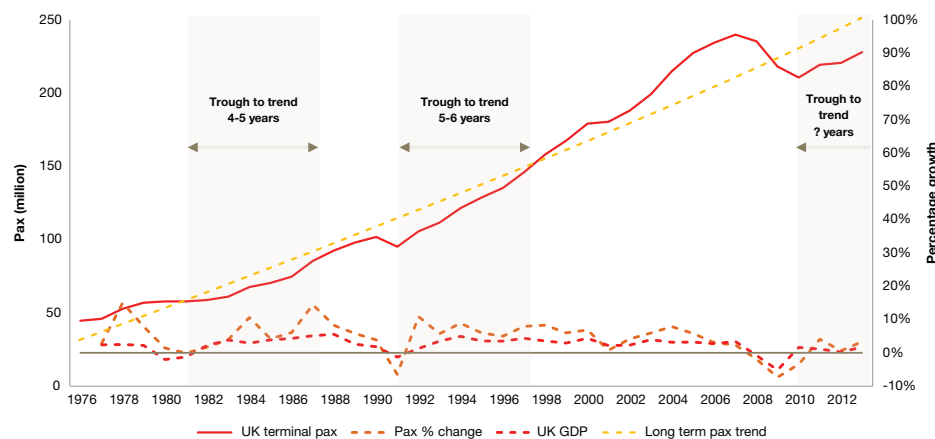
function of current earnings and expectations for future earnings growth, with the simple relationship being that the greater the growth potential, the higher the multiple.

In the case of airports, a primary driver of earnings growth potential is passenger growth.

Back in 2006-2008, observers expected long-term passenger traffic to keep growing at the rates seen in the immediate preceding years rather than revert to the long-term trend. Put another way, they anticipated a one-off upward shift in the long-term traffic trend.

These expectations were reflected in increasingly higher transaction multiples paid over that period. In effect, investors in airports were willing to pay high sums for the future growth they anticipated in 2007. Once investors realised that the expected growth wasn't going to materialise – and once credit markets tightened – transaction multiples declined.

Figure 2: UK airport traffic and GDP growth

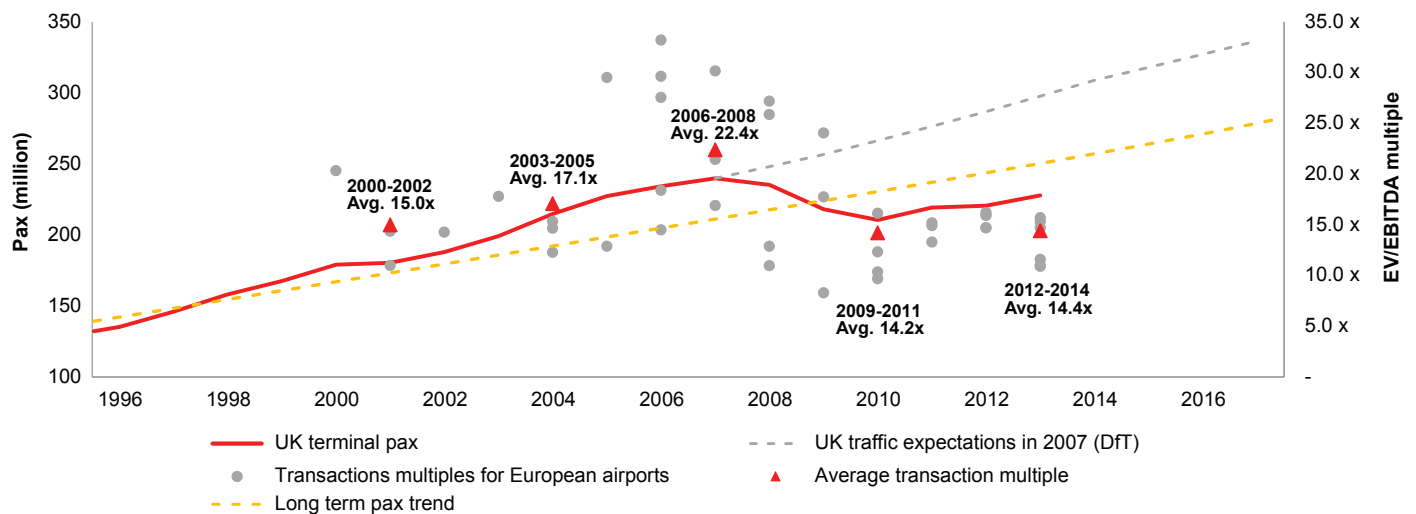


Source: CAA, PwC analysis

<sup>10</sup> The HAL transaction announced in Oct-14 is due to complete in Jan-15. The implied EV/EBITDA transaction multiple based on 2013 historic EBITDA is circa 16x.



**Figure 3: UK airport traffic and European transactions**



Source: CAA, DfT, PwC analysis, Press

Over the past three years, we have seen average transaction multiples stabilise at around 15 to 16 times EV/EBITDA. The latest UK traffic data (for the full year 2013 and for the eight months to August 2014) suggests that future terminal passenger growth may follow this revised long-term traffic trend.

Furthermore, there have been recent encouraging signs on the UK economic front: based on the latest data released in October 2014, IMF has upgraded its UK GDP forecasts since October 2013 by over a full percentage point for 2014 (1.9% to 3.2%) and by over half a percentage point for 2015 (2.0% to 2.7%). Therefore, downside risk to the sustainability of future UK traffic growth has lessened in the past year. However, Eurozone GDP forecasts have remained broadly unchanged over the period, and economic sentiment in the region has deteriorated in recent weeks as a result of deflationary fears and slowing growth in Germany's economy.

Despite the improved UK economic outlook, smaller regional UK airports remain vulnerable to risks given the shift in the balance of power to LCCs, who are increasingly mobile and can relocate their operations at short notice. Cardiff Airport and Glasgow Prestwick Airport were re-nationalised recently after failing to attract buyers, while Manston Airport (Kent) closed in May 2014 and Blackpool Airport closed to commercial operations in October 2014. These developments demonstrate that the divide in growth prospects for UK regional airports continues to widen. The key for smaller regional airports is to ensure a healthy balance in airline customer dependence such that the traffic growth expectation is sustainable.

**Note:** The transactions we are talking about here relate to European as well as UK airports. We believe that the two airport markets are sufficiently developed and similar to draw consistent insights from the data.

## What influences an airport's value?

### Discounted cash flow analysis.

While transaction multiples provide useful valuation benchmarks, typically the discounted cash flow ('DCF') valuation methodology is used as the primary approach to value airports. This is because airports generally have long-term projections that offer cash flow visibility. The DCF approach is also more appropriate for differentiating between an airport's revenue streams (aviation, retail, real estate, external operations) and the various regulatory mechanisms under which airports operate.

### Airport transaction multiples.

There are clear challenges in comparing transaction multiples between airports. This is due to each airport's specific operations and individual growth prospects. In addition to market factors and competitive bidding conditions at sale, key factors affecting airport value and transaction multiples include the following:

- **Maturity of the airport.** Most large, mature airports have less potential to increase traffic than smaller regional airports and may trade at a lower multiple. For a small regional airport starting from a low passenger base, attracting two or three new airlines can transform the business – a prospect that is often reflected in transaction multiples. Conversely, larger airports tend to have a broader airline base, so they are less vulnerable to customer concentration risk and volatility.
- **Potential for yield improvements.** Airports with non-aeronautical revenues that are lower than those of comparable airports can boost their earnings by improving their retail offerings, increasing parking fees, and making other similar enhancements. This potential for better earnings can also be reflected in transaction multiples. However, to benefit from an enhanced non-aeronautical revenue stream, can require significant capital expenditure investment.
- **Regulatory environment.** Airports are typically subject to regulation when regulators see them as holding substantial market power. Regulated airports' risk/reward profile differs from those of unregulated airports – for example, investors see regulated airports as more vulnerable to changes in regulatory regimes, which translates into regulatory risk. Airports are also subject to different regulatory environments in different jurisdictions. In the UK, for instance, regulated airports are allowed to earn a return on their regulated asset base (RAB). RAB is therefore a key valuation metric, and the market places significant emphasis on enterprise value to RAB multiples in assessing the value of regulated airports.
- **Catchment area penetration.** The extent to which an airport has penetrated its primary and secondary catchment areas affects its passenger growth potential.
- **Capacity constraints.** Runway or terminal capacity constraints tend to depress an airport's traffic growth potential. Alleviating these constraints may require significant capital expenditure as well as planning and regulatory approval.
- **Airport traffic mix.** The make-up of an airport's traffic – the mix of short – and long-haul as well as business, leisure, charter, and low-cost traffic – affects airport earnings. For example, traffic mix can strongly determine an airport's commercial revenue spend per passenger. Domestic passenger retail spending will tend to be lower than that of leisure travellers (such as charter), owing to shorter airside dwell time. Business traffic is a lucrative revenue stream, given it will likely stay steady during an economic slowdown, compared to other traffic types such as charter.
- **Airline customer dependence.** The degree of airline concentration at an airport will affect value. If an airport is highly dependent on one or two key airline customers, a reduction in aircraft capacity (due, for example, to reallocation of aircraft capacity across an airline's network or airline bankruptcy) will have a material impact on the airport. Further, airports typically have to renegotiate tariff increases on a frequent basis with their main carriers, and single airline dominance at an airport will affect the balance of negotiating power in favour of the airline.
- **'Stickiness' of airlines.** The extent to which an airline has the option to relocate operations to another airport that serves the same catchment area will determine the stickiness of an airline to a particular airport and will affect value. Stickiness subsequently determines the balance of negotiating power in tariff negotiations (the extent to which tariffs can be increased without significant adverse effects of the airline moving its operations away from the airport). It is difficult to isolate the impact of airline stickiness in a transaction multiple. However, we have observed adverse impacts through the suppressed EBITDA margin of airports that do not have strong power in price negotiations with airlines.
- **Dividends.** The history that an airport has demonstrated in paying regular dividends and the potential capacity to continue paying these regular dividends will affect value. Given that airport investors often invest with their eye on the long term, the prospect of regular dividend payments will cause investors to see the investment as more liquid. Airports also offer the flexibility of being able to support dividend payments during a slowdown through the deferral of operating costs and rescheduling or reducing of capital expenditure.

## Given the number of circumstances affecting an airport's value, investors need to carefully assess airports' comparability and adjust transaction multiples where appropriate.

### Where do we go from here?

The picture is continuing to improve for certain advanced economies. But emerging economies like India, Indonesia, Turkey, South Africa, and Brazil have run into trouble over the past year as capital has begun flowing back to the advanced economies. While this situation appears to have subsequently stabilised, the pace of European economic growth remains uncertain and the economic impact of the Fed ceasing its quantitative easing programme and raising interest rates is unclear.

After generally disappointing growth in 2011 and 2012, the UK economy showed signs of recovery in 2013 and GDP forecasts have continued to be upgraded throughout 2014. Consumer spending growth is projected to follow a slightly more optimistic GDP growth rate in the UK. Yet downside risks to growth remain, albeit to a lesser extent than in 2013, owing to the possibility that the current relative calm in the Eurozone may not last.

The speed at which traffic may return to the long-term trend line hinges on the pace of economic recovery. Figure 4 sets out current passenger number expectations for the UK aviation market, but also projects a range of potential passenger growth profiles based on forecast UK GDP growth and a range of income elasticities.

In Figure 2, we saw that in the early 1980s and 1990s, it took four to six years for traffic to revert to the long-term trend after an economic slowdown.

The patterns in Figure 4 suggest that even in a high-growth scenario, passenger numbers are unlikely to revert to the trend line before 2022-2024.

Given that the drop in UK passenger traffic since 2007 has been markedly sharper than that observed in previous periods of economic recession, a 10-12 year period for reversion to the long-term trend does not appear unlikely. Indeed, if one were to focus on lower passenger growth profiles, it could be argued that the long-term trend line is shifting downwards and that the premise that traffic always

reverts to long-term historical trends must be questioned.

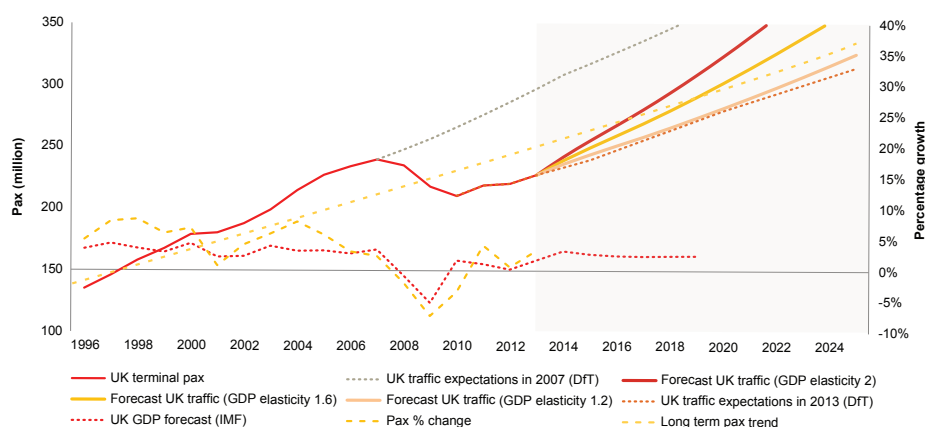
Looking at current growth expectations and market uncertainties, we do not expect to see a sustained return to the 20+ times transaction multiples observed in the mid-2000s in the short term.

However, once there is greater visibility into the strength and pace of traffic recovery, nothing precludes seeing this level of multiples in the medium term if there are asset-specific reasons to justify this. As can be seen in Figure 3, airport transaction multiples are perhaps stabilising.

Given current market evidence, we would continue to expect higher growth regional airports to transact within a range of 14 to 18 times EV/EBITDA, and larger more mature airports in the range of 10 to 14 times EV/EBITDA.

There is certainly significant interest in the airport assets coming up for sale, and competitive tensions may increase transaction multiples observed.

**Figure 4: UK airport traffic – reversion to trend**



Source: CAA, DfT, IMF, PwC analysis

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## *If you're thinking about investing*

**1**

### ***Cyclicality should be built into long-term cash flow projections***

When assessing the value of an airport, it is essential to recognise the cyclicality of the industry, consider where we currently sit in the economic cycle, and build sensitivities into cash flow projections to reflect economic downturns and other risks. Recent evidence suggests that airport performance is not as immune to wider market volatility as perhaps once thought.

**2**

### ***Airport transaction multiples are unlikely to reach pre-recession levels in the short term***

Given current growth expectations and market uncertainty, we do not expect to see a sustained return to the +20x EV/EBITDA transaction multiples for European airports in the short term. However, once there is greater visibility around the strength and pace of traffic recovery, there is nothing to preclude observing this level of multiples again in the medium term, if there are asset-specific reasons to justify this.

**3**

### ***A comprehensive assessment of comparable transaction multiples is required if used as valuation benchmarks***

While airport transactions clearly provide useful valuation benchmarks, it is imperative to undertake a comprehensive assessment of the comparability of transactions and make appropriate adjustments if it becomes apparent that they are incorporating different, or even unrealistic, growth expectations.

**4**

### ***Reversion to the long-term passenger traffic trend will take several years***

An assessment of historical UK passenger traffic suggests that growth rates are not constant. With potentially a 10-12 year period before traffic reverts to historical passenger growth trends, it seems timely to revisit the premise that traffic always reverts to long-term trends.

**5**

### ***Airport operators and financial investors are increasingly joining forces to deliver airport value improvements***

We see an increase in airport operators forming consortia with financial investors with the aim of delivering value enhancement through operational and financial structuring improvements. The key messages arising from this paper are relevant to both trade and financial investors.







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conversation about how this  
subject may affect your  
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