

Aviation Connectivity and the Economy

The Mayor of London's response

April 2013

1. Purpose of paper

1.1. In March 2013, the Airports Commission produced the second of its Discussion Papers, focusing on the issue of aviation connectivity and the economy. Our response to the questions posed in the Discussion Paper have been addressed in the following sections and these are cross referenced in the Appendix:

- Defining connectivity
- The importance of a hub airport in delivering connectivity
- The UK's current position
- How connectivity impacts on the economy
- Securing wider growth and regeneration benefits for the UK
- Measuring connectivity
- The impact of capacity constraints on connectivity

1.2. As part of our work examining long-term options for London and the UK, we are currently undertaking research into the potential connectivity outcomes of different new capacity alternatives. This includes the potential route networks that a new hub airport serving London with a minimum of four runways, as well as dispersed expansion (for instance creating three two-runway airports within the London airport system) could offer. We will submit this work to the Commission at a later date.

1.3. The Commission seeks specific evidence of the impact of connectivity on five key economic 'channels' (trade in services, trade in goods, tourism, business, investment and innovation, and productivity). These elements underpin the wider economic benefits that aviation generates in the economy as a whole, but there are also growth and regeneration benefits arising from airports and the associated and additional activities that they trigger locally and regionally. Our work is therefore also examining the benefits of planning new airport capacity as part of a broader national economic growth and infrastructure strategy.

2. Summary of key issues

- The whole of the UK benefits from London's status as a leading world city, due in part to historical investment in airport infrastructure. We cannot expect to enjoy the same status in the future on the back of our past legacy.
- Improving London's air service connectivity – direct longhaul routes in particular – is especially important for the economy and many key routes and high frequency services can only be provided at a hub airport.
- The connectivity offer of an airport is important, in both absolute and relative terms. Cities and airports compete with one another.
- Were Heathrow not capacity constrained, its connectivity offer would be significantly greater today.

3. Defining connectivity

- 3.1. Connectivity relates to the ease with which people or goods can be moved between desired origins and destinations.
- 3.2. A desired location may be served directly from a convenient airport, an indirect routing may be required, or no practical routing at all may be available.
- 3.3. Direct connectivity is of much greater value than indirect connectivity. Trade and investment links are far more likely to develop for those locations with direct services. For some industries, services and activities, direct access to markets and resources is an essential and non-negotiable attribute.

The UK trades more with countries that have effective direct connections. Frontier Economics (2011) established a clear correlation between the level of trade and air connectivity in the UK. The report identified that UK businesses traded 20 times as much with countries where there are at least daily flights compared to those with less frequent or no direct connections. As a result it was estimated that UK trade could increase by around £1.2 billion per annum if there was sufficient capacity at Heathrow to accommodate viable routes to emerging markets. Recent work for the CBI (2013) further supported this analysis. Over the last two decades the UK's air links with emerging economies have grown by 266%. Trade with these economies has grown at a similar rate. The CBI concluded that a new daily air service to each of the world's eight fastest growing economies could result in an increase in UK trade of over £1 billion per annum.

Direct connections are seen as much more valuable by key business users in London. In 2008 and 2011, York Aviation conducted detailed consultations with businesses in the City of London to identify the key requirements for air service connectivity to support London as a financial centre. Direct connections are particularly important for business travellers. Having to change planes to reach a destination is universally unpopular. It wastes time and

adds uncertainty to a journey through the potential for missed connections. We need to ensure that businesses travellers can reach key destinations directly.

The range of direct connections offered is important and will become even more so.

Recent research by the Institute of Directors (IoD) (2012) found that over a third of IoD members (37%) say that direct flights from the UK to emerging markets are important to their business at present. Nearly two thirds of IoD members (63%) say that direct flights from the UK to emerging markets are likely to be important to their business in the next decade, compared to just 20% who think they will remain unimportant. IoD members are unambiguous: high growth markets¹ will become far more important over the next decade, underlining the importance of developing new routes from the UK.

- 3.4. An indirect routing requires passengers or goods to change planes, and will take much longer. The inconvenience of changing further reduces the quality of service and journey experience, and increases the risk of journey delay. Business travellers in particular are keen to fly direct, and will usually pay a significant premium to do so.
- 3.5. There are risks associated with relying on other airports – especially those overseas – to offer indirect connectivity. Better access to the global economy for both London and the UK regions will always come from a world-class London hub, rather than one overseas. Connections between London and the UK regions will be supported by a strong point-to-point demand to London, and overseas connections beyond London will be enhanced by London’s extremely large local catchment.
- 3.6. Connectivity is also relative, as well as absolute. While a destination can either be reached directly or not, there are usually a number of options or possibilities for reaching the desired destination. Some will be easier or cheaper or faster or more reliable than others. The attractiveness of the connectivity offered by one option is defined by the connectivity offered by the alternatives. This means that there is significant value in the UK’s hub airport performing better than its rivals, with regard to all of the factors described in the Discussion Paper in section 2.1.
- 3.7. Connectivity is not just about what an individual or group of individuals needs at any given moment or for a particular journey but also about what potentially they might want to have access to. An airport which has the potential to serve a comprehensive network of destinations now, and which has the capacity to expand its network in the future, is hugely valuable. Trade and investment is attracted to world regions on the strength of their connectivity potential.

¹ In general TfL’s analysis and research adopts the Goldman Sachs (2011) typology so Growth Countries (8) include Brazil, Russia, India, China, Mexico, South Korea, Turkey and Indonesia while a larger group of Emerging Economies (23) cover Poland, Saudi Arabia, South Africa, Argentina, Iran, Venezuela, Columbia, UAE, Malaysia, Egypt, Nigeria, Chile, Czech Republic, Philippines, Pakistan, Romania, Peru, Ukraine, Hungary, Qatar, Kuwait, Bangladesh and Vietnam.

Globally mobile investment is attracted to well-connected regions. The annual Cushman & Wakefield European City Monitor asks around 500 senior executives what the best places to locate to in Europe are. This survey consistently identifies factors such as '*transport links with other cities*' and '*easy access to markets, customers or clients*', as critical. Air connectivity is a vital factor. A substantial body of research demonstrates the importance of connectivity and the detrimental economic consequences of persistent constraints:

- Research undertaken for ACI EUROPE by York Aviation (2004) identified that access to major airports was important for investment decisions across a range of economic sectors.
- Bel and Fageda (2005) considered the influence of intercontinental flights on head office location. They found that the supply of direct intercontinental flights was effectively a major determinant in the location choices of large firms' headquarters. Indeed, a 10% increase in the supply of intercontinental flights involves a 4% increase in the number of headquarters of large firms located in the corresponding urban area.
- Research by Oxford Economics (2006) assessing the contribution that the air transport industry made to the UK economy found that one quarter of firms reported that access to air services was important in determining where they locate their operations in the UK.
- Research undertaken by Oxford Economics for IATA (2006) sought to quantify the link between air connectivity and business investment. The research found that a 10% increase in connectivity is associated with a 3.5% increase in the level of fixed investment in the long run.
- The City Aviation Study (2008) found that 27% of firms believed they would be very badly or quite badly affected by a failure to expand airport capacity. Significant numbers cited impacts around investment decisions as being potential effects of this failure, such as downgrading of the London office status, movement of corporate functions away from London, less investment in UK operations or relocation of operations to another country.
- Recent research by the IoD (2012) identified that almost six in ten members agreed that a lack of spare capacity at Heathrow has had a damaging effect on inward investment to the UK. In every region of the UK, a majority of IoD members agreed with this analysis.

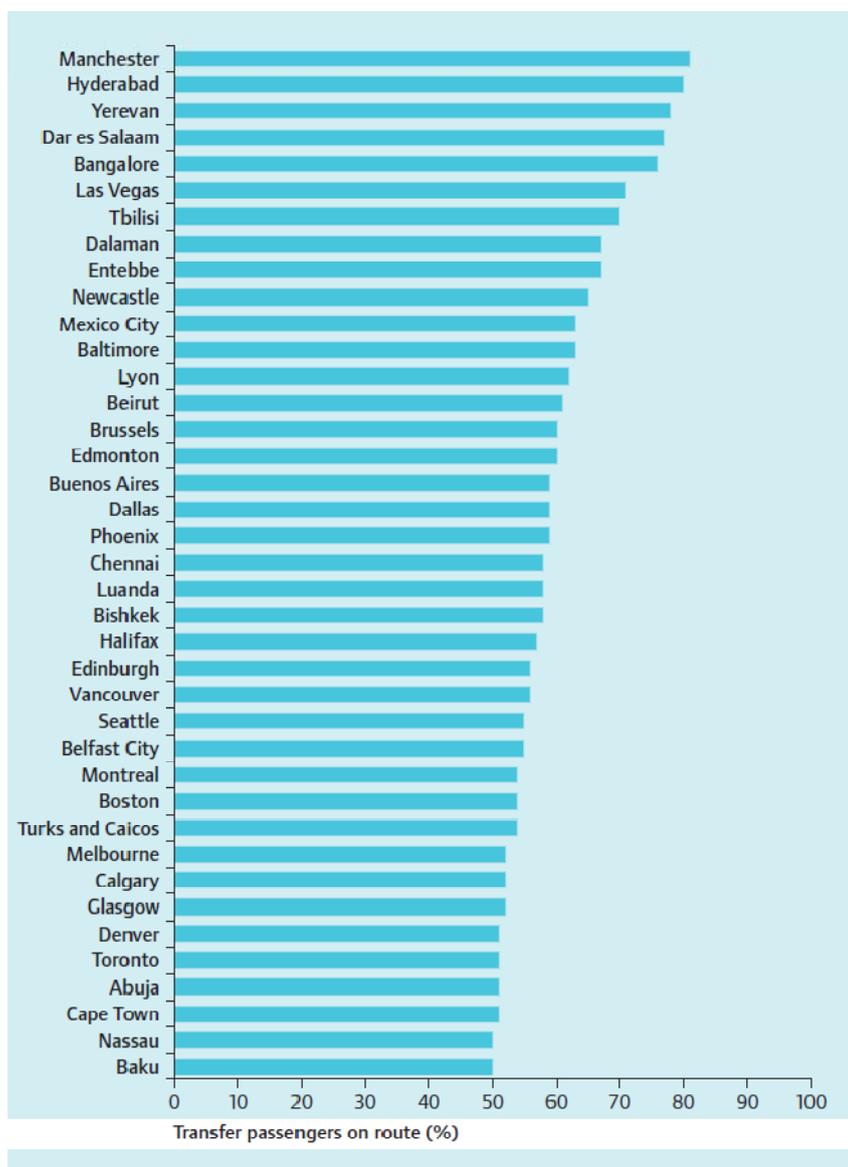
3.8. Ensuring a wide range of destinations is important but that should not mask the fact that some destinations will be of particular economic value. Table 2.1 in the Discussion Paper highlights the greater total number of destinations served from London; but this margin is highly reliant on the European destinations served, a significant proportion of which are primarily leisure destinations with limited trade potential. These destinations are not at all equivalent in economic value to a longhaul destination in a high growth emerging market like Mainland China. Understanding the value of direct connectivity to specific countries and cities being served is important if one is to fully ascertain the health of London's and the UK's offering. It should be a key consideration in any measurement of connectivity, as we discuss below. This is why we are undertaking research into the potential connectivity outcomes of different new capacity alternatives.

The UK must support export driven manufacturing growth. While the Discussion Paper correctly highlights the importance of the UK's aerospace industry with its high levels of exports, annual turnover of £23 billion and 100,000 high skilled workers, it is important to consider how the cumulative economic impacts of enhanced connectivity would support the exporting potential the UK's manufacturing sector. Clearly a world class hub airport would significantly support the aerospace sector by offering the potential to showcase its capabilities and providing the opportunity for advanced manufacturing and supply chain activities close to the airport. But the same logic also applies to a much wider range of sectors. With significant export driven growth, the UK's automotive sector trades in 100 markets worldwide to produce 11% of all goods exported and employs 720,000 people across a sector worth £50 billion a year. Like the 'ramp up' expansion underway in the aerospace sector, some 1.58 million cars were produced in the UK in 2012 with some 83% destined for export. This international resurgence has only been possible by through securing high levels of globally mobile investment from leading firms such as Tata's Jaguar Land Rover and Nissan, whose Sunderland factory is now the most productive Europe. As every car assembly line job supports another 7.5 jobs in the UK supply chain – with up to a further £3 billion of parts which could be fulfilled by UK suppliers – there are significant economic opportunities for the UK. An extensive network of international routes has the potential to support export driven growth in the UK while also securing benefits for smaller firms across the country.

4. The importance of a hub airport in delivering connectivity

- 4.1. A hub airport is key to maximising connectivity and enabling the global trade and investment links that are vital to growth. Hub airports combine point-to-point and transfer traffic to build a critical mass of demand – which enables a significantly greater range of routes and frequencies than could otherwise be supported.
- 4.2. This consolidation of demand is important for both short and longhaul services. For those routes that are viable without transfer traffic, the additional hub transfer flows enable a higher frequency of service to be offered – particularly key for attracting premium business passengers, who place a high value on comprehensive flight schedules.
- 4.3. As the Airports Commission notes on page 6 of the Discussion Paper, transfer passengers support the number and frequency of many routes. At Heathrow, services to key emerging cities, such as Hyderabad and Mexico City, and to more established business destinations, such as Seattle and Calgary are heavily underpinned by hub traffic, as illustrated in Figure 1.
- 4.4. It is not just the consolidation of passenger demand that is important. Typically 5-10% of revenue on longhaul passenger flights comes from freight.

Figure 1: Routes from Heathrow with the highest proportion of connecting passengers (York Aviation, 2011)

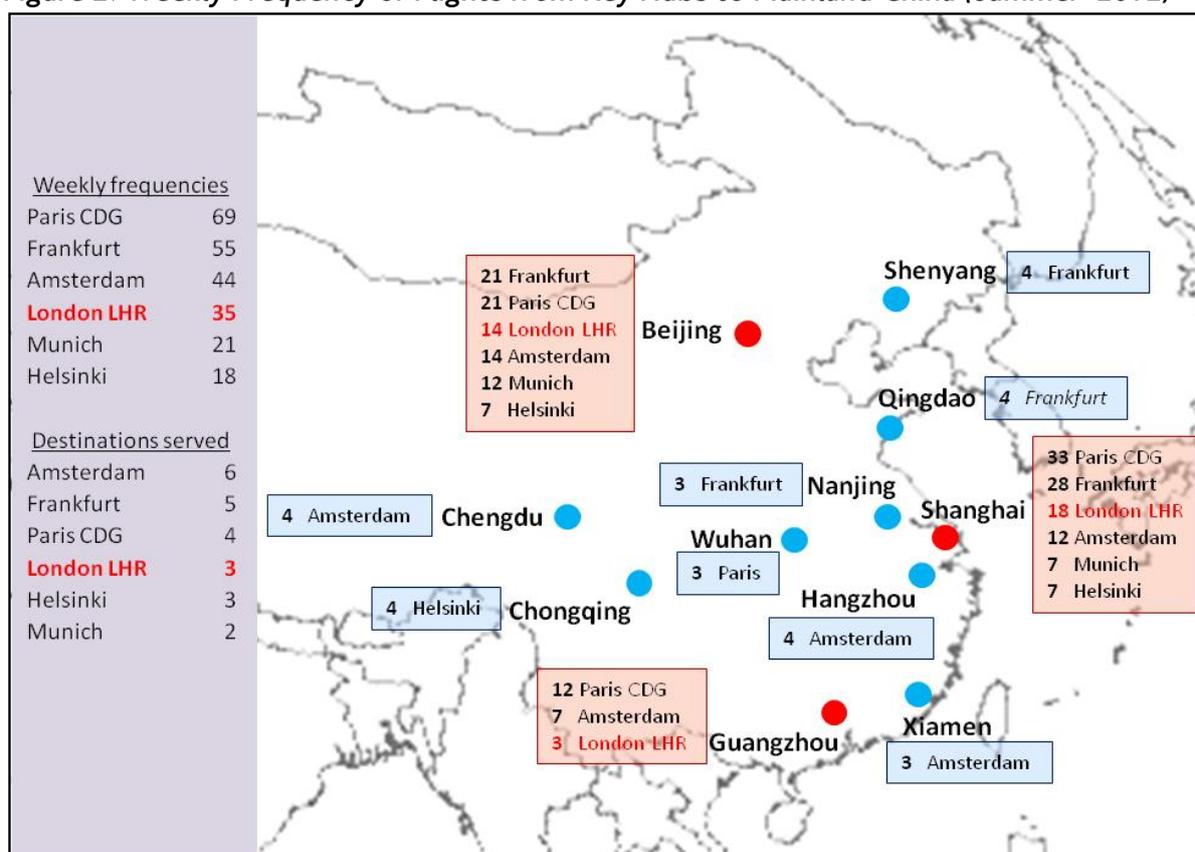


- 4.5. Routes to new destinations will be critically dependent on transfer passengers in order to get services established. This is a fundamental reason why hub capacity is so important.
- 4.6. It is important to recognise that those parts of the UK not in close proximity to the hub also benefit. Having a global hub in London is important to the UK regions as well as to London. It offers the region the prospect of supporting both enhanced connections to London as well as global markets.
- 4.7. Only with available and fully functioning hub capacity will London be able to support direct routes to a wide and growing range of key economic centres around the world, essential for London and the UK's future economic competitiveness and prosperity.

5. UK connectivity today

- 5.1. London has traditionally benefitted from its strong array of aviation connections to established markets such as North America, where few cities can match its access. However, capacity constraints at its hub airport have served to undermine London's connectivity, particular to the key emerging high growth economies of the future. Therefore, it is necessary to consider connectivity to individual markets, as well as the overall trend.
- 5.2. While London offers good access to India, it is falling behind on route provision to Brazil, Russia and China. Paris offers twice the number of flights to South America and to twice the number of cities. Paris, Frankfurt and Amsterdam are all able to offer more flights to more cities in Mainland China than London and the UK. And it is falsehood to merely compare London to European competitors on the assumption that parity is fine. Given London's size, economic power and future potential - the Capital's population is forecast to grow to 10 million by 2031² - it should be ahead of its competitors now and seeking to increase this advantage further into the future. It currently fails on both counts.

Figure 2: Weekly Frequency of Flights from Key Hubs to Mainland China (Summer 2012)



² GLA (2012) projections forecast the population of London increasing from 8.2 million in 2012 to reach 10 million in 2031 and 10.5 million by 2041. This 28% increase would add 2.3 million residents in less than three decades and is broadly equivalent to adding the entire population of Birmingham, the UK's second city.

- 5.3. To identify Britain's access to Hong Kong as a counter to our weakness to Mainland China is to fail to appreciate the extent to which they operate as distinct political, economic and cultural entities as well as Hong Kong's weaker onward connectivity to Mainland China. Hong Kong may be linked to around 40 Chinese destinations but that is fewer than half the number served by the hub airport in Guangzhou (over 100), just across the border. Hong Kong offers inferior access to the growth areas of Mainland China.
- 5.4. There will be implications for UK businesses not only from not having direct, frequent connections with a range of cities in Mainland China, but also from the UK's hub not having the best connections to Mainland China.
- 5.5. In Section 2.8, the Discussion Paper suggests that the UK's weaker connectivity to Mainland China can partially be explained by London passengers changing planes in Hong Kong, but many of these passengers are travelling to other destinations in the Asia-Pacific region. But were the UK's hub capacity unconstrained, there is no reason to believe that London would not offer both high frequencies to Hong Kong and direct flights to a wider range of Chinese cities.
- 5.6. There can be little question that were Heathrow not capacity constrained; its connectivity would be significantly greater. This issue is explored further in section 9.

6. How Connectivity Impacts on the Economy

- 6.1. The economic importance of air services is not confined to traditional economic impact metrics, such as direct or indirect employment creation. There are effects for the economy which are outside of those that which are captured fully by existing economic appraisal techniques.
- 6.2. In broad terms, we consider that improving air connectivity can impact on the economy in the following ways:
 - **Increasing foreign direct investment (FDI)** – there is a significant amount of evidence to support the existence of a link between air transport and the attraction or retention of inward FDI. This applies to both inward and outward investment, both of which can be beneficial to the UK in the right circumstances. Air connectivity facilitates effective management and operation of central administrative functions, allows the transfer of knowledge and technology. It also enables specialists to operate across a range of locations, and enables access to clients, markets and suppliers from branch locations.

London is vital to securing the UK's share of global FDI. London is the destination for one third of the UK's FDI. In 2011 the UK had FDI inflows of US\$53 billion. Between 1999 and 2009 on average one third of all annual FDI to the UK has been attracted to London. FDI creates jobs, expands local supply chains and improves the productivity of domestic firms and London continues to play a dominant role in securing the UK's share of FDI in a competitive global market. In 2011 the stock of FDI in the UK was US\$766 billion, with 52% originating from outside the EU. Between 2000 and 2011 UK direct investment in India increased nine fold but UK flows into China just tripled in part due to the poor connectivity.

- **Increasing trade in goods and services** - the importance of air travel and air connectivity in increasing levels of trade is well established. In relation to trade in goods, air cargo is a quick and efficient means of transporting goods around the world, which makes economic sense in relation to the transport of many goods, primarily those that are high-value, low weight or time critical. Passenger connectivity is also important in terms of trade. Companies need staff to travel to meet potential customers, to secure deals and to provide after sales care. Trade in services is also heavily reliant on attractive levels of air service connectivity.

Openness to trade leads to faster economic growth and improved productivity. More open economies are able to achieve economies of scale as trade increases the market size for producers. Countries and cities can focus on their comparative advantages and operate more competitively. The resulting high level of specialisation is particularly self evident in London across financial services (31% of all UK jobs, 250 foreign banks, and the world's largest insurance and foreign exchange markets), business services and the creative sector. London's total export of goods and services totalled £66.4 billion in 2008, accounting for one third of all of the UK's exports.

London and the UK are already losing out in the international air freight market³. In 2011 some £116 billion of commodities were shipped between the UK and non-EU countries – a fifth of all trade by value. Some 35% of UK trade with non-EU countries by value is transported by air and Heathrow, the UK's largest port by value, accounts for 24% of the UK's non-EU trade by value. As the Discussion Paper notes over 75% of the UK's non-EU exports of optical photographic, medical and surgical equipment are exported by air⁴. As a consequence every single flight to India and China from Heathrow has a very high export value. While air freight at the world's top 20 airports grew by 3.5% per annum between 2006 and 2010, forecasts show increasing growth potential. World cargo is forecast to grow on average by 5.25% per annum between 2011 and 2031, but by 5.7% annually between Europe and Asia and

³ TfL Aviation Unit – The Air Freight Market (Forthcoming 2013)

⁴ BIS analysis of HMRC Overseas Trade Statistics

between Europe and the Middle East. The current freight capacity limitations at Heathrow evidenced by the virtual exclusion of freighter traffic, night flight restrictions and the growth in trucked freight are already cutting into the potential to grow the UK's air freight market. Other more successful freight competitors such as Frankfurt are able to offer spare day time capacity and provide a better service offer particularly to the high growth BRIC countries. As a result, there are very real long term competitive risks to a sector that adds £7 billion to the UK's GVA, supports 140,000 jobs and plays a key role in ensuring the retention of major international manufacturers.

- **Enabling tourism** –inbound tourism in UK is a hugely important economic sector, and because we are an island, we are dependent on our aviation links. Tourism in London alone accounts for £6.6 billion of the £34.3 billion 'tourism direct GVA' created nationally⁵. London is one of the most visited cities in the world with nearly 15 million international visitors annually. But all visitors are not equal economically. Average spend per person per stay is greatest from visitors from certain longhaul destinations, as per Figure 4 below.
- **Enabling travel to visit friends and relatives (VFR)** – outbound travel is also an extremely valuable social benefit especially for visiting friends and relatives across the world and giving leisure choice – all important in maintaining a productive workforce, widening London's labour market and underpinning the diverse and vibrant social fabric of London. These links also encourage inbound travel, boosting local tourism spend and investment.

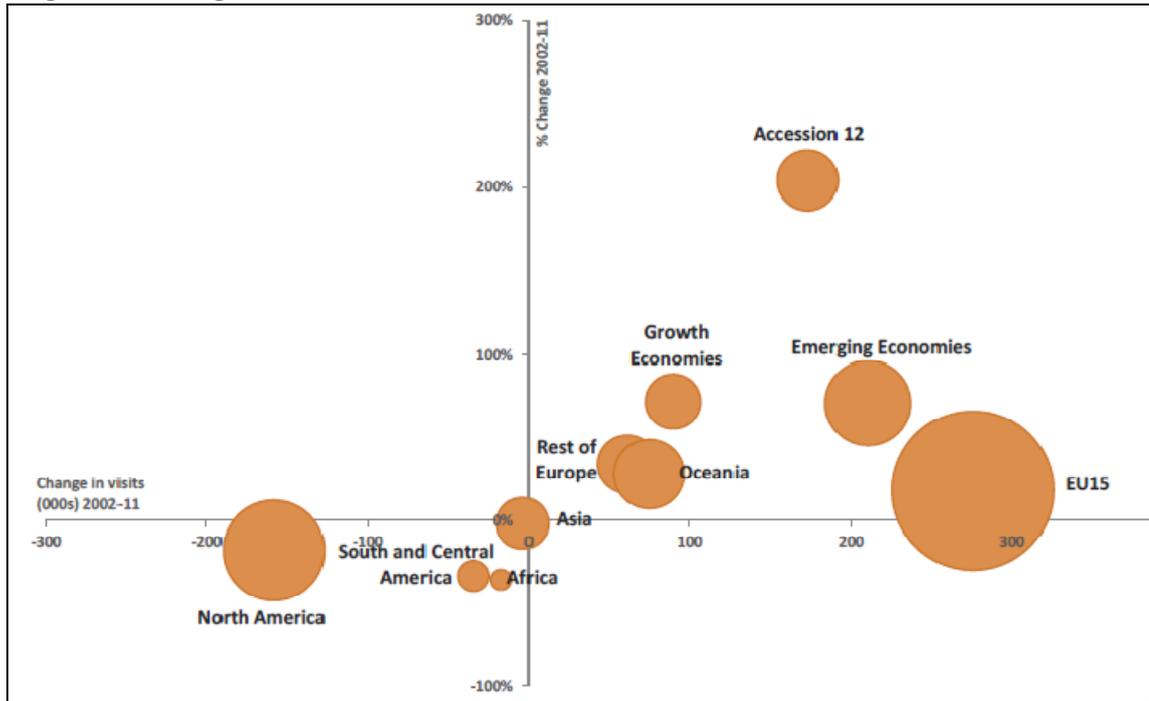
Figure 3, Average spend per person per visit to the UK by different nationalities (ONS, 2011)

UAE	£2,253
China	£1,690
Russia	£1,158
Malaysia	£1,135
India	£893
Brazil	£879
USA	£845
Japan	£698
Sweden	£528
Austria	£524
Italy	£520

⁵ GLA Tourism in London (May 2012)

The potential of visiting friends and relatives (VFR) tourism from new and emerging economies⁶ is enormous. In 2011, 4.2 million people used air travel for visiting friends and relatives in London, spending £2.3 billion and accounting for half of all inbound VFR trips to the UK. Air related VFR spend in London from visitors from Growth Economies⁷ has been increasing by 11% per annum since 2002 and average trip length is 23 days compared to just six nights for visitors from EU15⁸ countries.

Figure 4. Change in air related VFR visits to London 2002-2011



Source: ONS International Passenger Survey. Size of bubble reflects total number of air-related VFR visits to London in 2011. NB. Poland, the Czech Republic, Hungary and Romania are included in both A12 and Emerging Economies.

We should provide adequate outbound VFR opportunities for all of London's population. With over 3 million of London's population being born outside the UK, there is a clear social equity argument to ensure that there is a wide range of air travel opportunities that allows all residents to be able to visit their friends and relatives overseas. More than 300 languages are spoken in London and it has at least 50 non-indigenous communities with populations of 10,000 people or more.

- **Enlarging and deepening labour markets** - an area that is increasingly being identified as one of the channels of impact through which air connectivity operates is its influence on the labour market through its ability to influence individuals' decisions around where and how much labour to supply. The ability

⁶ TfL Aviation Unit – The Economic Importance of Visiting Friends and Relatives (Forthcoming 2013)

⁷ Brazil, Russia, India, China, Mexico, South Korea, Turkey and Indonesia.

⁸ Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, United Kingdom.

to attract skilled migrants to live and work in London and the UK both increases the total amount of labour available to support output and has potentially positive implications for long run productivity in the economy as those with new or higher level skills are attracted to work.

London has an unparalleled international highly skilled labour force. With a more diverse population than any other international city, London's broad, deep and highly skilled labour force is on average 33% more productive than the UK as a whole. The proportion of London's working age population with a tertiary qualification is more than any other global city (and at 50%, far above the UK average of 30%). With 23% of London's labour force being made up from non-UK nationals (and half of those coming from non-EU countries) international migrants are a key attraction for London's firms. And these trends have been accelerating in the capital with foreign born residents increasing from 2 million to 3 million over the ten years to 2011. London's popularity with international students together with five of the UK's top ten research universities being located in London reinforces these trends, adds to the supply of a highly skilled and youthful labour force (especially 24 to 39 year olds) and increases spending on UK goods and services - overall the Higher Education sector is worth £15 billion to the UK. In 2011 there were 103,000 non-EU students in London, a cohort that has been rapidly expanding by 7% each year since 2002. Foreign students also play a key role in influencing the Visiting Friends and Family (VFR) element of tourism activity in a virtuous circle.

- **Enhancing productivity.** Agglomeration effects are productivity benefits derived from the concentration of economic activity in an area. In other words the more firms located within an area the greater the likely agglomeration effects. Air connectivity can have a direct impact with air services increasing the effective density across large geographies by compressing travel times.

London's economic success has been derived from the long term benefits of agglomeration. The result is that one third of London's jobs are concentrated centrally, the largest and most productive node of employment in the UK. By locating next to each other firms secure benefits that make them more competitive locally and internationally than if they were dispersed. These benefits include the shared labour markets, a highly skilled and deep pool of labour, and close formal and informal networks for developing, testing and sharing ideas and the rapid transfer of innovation – all of which are facilitated by air connectivity. The increasing agglomeration of high-wage financial, business and professional services in Greater London and neighbouring parts of the South East undoubtedly confers major benefits – both nationally and regionally – not least the location there of highly productive, internationally competitive and vital export earning activities.

7. Securing Growth and Regeneration Benefits for the UK

- 7.1. As well as the more direct transmission mechanisms, there are wider growth and regeneration benefits arising from airports and the significant additional activities that they will trigger. This wider scope also includes the land use planning and environmental policies necessary to ensure efficient use and careful stewardship of scarce, highly valuable land resources in a rapidly growing world city.
- 7.2. Long-term land use planning is necessary to ensure that aviation connectivity is sited where it can best accommodate and leverage the growth potential of both the airport and the associated development that will follow. There must be sufficient space to accommodate new jobs, homes and infrastructure, and the potential for passengers, staff and freight to make use of a sustainable, efficient surface access and national distribution network. The unavoidable constraints now affecting Heathrow are the direct result of a failure to plan for the long term economic needs of the UK.
- 7.3. To maximise the catalytic effects of our aviation connectivity, there is a need to ensure new capacity not only facilitates hub airport operations, but that it is sited where there is adequate long term capacity to accommodate all development. Excellent road and rail access and adequate development land is a prerequisite to accommodate the most advanced logistical operations in Europe that will seek to locate near to a new expanded hub airport. Following on, there must also be potential to support the growth of advanced manufacturing activities including their time sensitive global supply chains⁹. This development potential patently does not exist around Heathrow or Gatwick (and any required residential development would be additional¹⁰) but it does to the east of London where a hub airport would be catalytic in completing the long term regeneration objectives for the area while, at the same time, leveraging past public sector investments. By way of comparison, significant airport corridors have developed out to Dulles airport in Washington and Arlanda airport in Stockholm: the former has an unparalleled concentration of telecommunication firms and has become a key centre of global internet infrastructure; the latter's high technology corridor is now home to 8,500 companies and 65,000 jobs.
- 7.4. In parallel, redevelopment of the Heathrow Airport site¹¹ offers the potential to reshape West London in a positive and more sustainable way. It could help to ensure

⁹ The sophistication of global supply chains for international manufacturers is even evident for a humble driver's seat in a Nissan. The driver's seat has an impressive supply chain all of its own with 95 different parts arriving from 17 suppliers in 18 different locations (11 in the UK and 7 overseas in Belgium, China, Germany, Poland, Romania and Spain). Each part travels an average of 472 km and the furthest moves 9,300 km (SMMT 2012).

¹⁰ If Gatwick was to expand as part of a 3x2 runway solution in line with forecast demand there is likely to be the need for an additional 19,250 houses within 40 km of the airport requiring an additional 480 ha of land – equivalent to 12 years of the annual housing completions in West Sussex.

¹¹ At more than 1,900 hectares the site of the former Stapleton Airport in Denver, Colorado is now being redeveloped to provide 63,000 new jobs.

that London's future needs - its population is forecast to increase by 2.3 million people by 2041 – are met, and repair a damaging hole in London's urban fabric. With high levels of public transport already in place, the 1,200 ha site (similar in size to the Royal Borough of Kensington and Chelsea) could offer a unique opportunity to accommodate at least an additional 200,000 of London's residents, triggering the creation of 46,000 jobs as well as addressing the pressing need for additional house building in London.

8. Measuring Connectivity

- 8.1. The Discussion Paper provides a useful overview of some of the key connectivity measures that have been developed or that are commonly used. Some are purely measures of the volume of connections in some form, others consider the importance of end destinations and others consider the value of indirect connections or the strength of individual hubs.
- 8.2. A number of approaches have been used in recent years, and there is a need for further research in to how to best forecast potential connectivity and the potential benefits it offers. The most valuable measure will be one which is able to consider:
 - the decision-making process that underpin the use of air services,
 - the potential of value of direct connections to different destinations, as opposed to those requiring a change of plane,
 - the present and the future value of serving specific destinations directly at a specific frequency, with certain available capacity,
 - the competitive nature of international air service provision.

9. The impact of capacity constraints on connectivity

- 9.1. It is difficult to know what the world would be like without UK hub airport capacity constraints, and therefore what London's connectivity might look like. But we do know that worldwide, aviation demand is due to double between now and 2030, and that the number of countries and cities who are participating in an increasingly global economy is growing.
- 9.2. Demand models used by the DfT and others are built and calibrated in a capacity constrained world, and airline and user behaviour has already been affected.
 - **Airlines are prioritising the use of scarce slot capacity on the most immediately profitable routes.** As slots at Heathrow become increasingly scarce, they change hands for ever larger sums. The high opportunity cost attached to a slot – usually in the tens of millions of pounds – strongly incentivises airlines to deploy them most profitably, typically on established longhaul business routes,

such as to North America. This has been at the expense of shorthaul services (particularly domestic services; in the space of twenty years, the UK cities served from Heathrow has fallen from 18 to 7, eroding the regions' access to global markets), as well as routes to emerging market destinations. Though valuable for the UK economy, airlines struggle to justify reallocating slots to launch a new route when there are more bankable destinations; meanwhile the national carrier at the other end of the route cannot justify the high cost of buying the slots at Heathrow to start the service.

- **Such routes are instead launched from other European hubs** where the supply of slots is less constrained – and these hubs gain a valuable first-mover advantage on the route as it develops over time. This will then make it harder for London or UK airports to enter these markets and exploit the commercial opportunities.
- **No growth will mean that the total number of destinations served at London's hub diminishes.** This trend is already underway and in 2050, according to the DfT's demand model, Heathrow could be expected to serve 20% fewer destinations. The thinner longhaul destinations lost from a constrained Heathrow will be least likely to be substituted by services from regional airports – these routes are particularly dependent on transfer traffic and as such most will not be able to survive outside the hub.

9.3. Trade and investment is attracted to cities around the world on the back of its connectivity potential. A new London hub, with a minimum of four runways will enable London and the UK to have a world-leading connectivity offer. This could transform the fortunes of London, the South East and the wider UK, serving as a magnet for business relocation, foreign investment, trade, and productive jobs.

APPENDIX

Airports Commission questions presented in Discussion Paper 02

[including the section of this document in which they are addressed]

1. Do you agree with the definition of connectivity presented in the paper? What other factors, if any, should we take into account and how do they impact connectivity? **[section 3]**
2. Do you agree with the assessment we have made of the UK's current aviation connectivity? **[section 5]**
3. What factors do you think contribute to the fact that the UK is directly better connected to some regions of the world than others? **[sections 3, 5 and 6]**
4. Given connectivity trends in the UK versus other European countries, how much scope is there for the route network available to UK residents to radically change over the coming years? **[section 9]**
5. To what extent do you consider indirect connectivity to be an important part of presenting an accurate picture of the UK's nature of connectivity? **[section 3]**
6. To what extent do you agree with evidence that aviation connectivity supports the UK's economic growth through facilitating each of (1)-(5)? ((1) trade in goods, (2) trade in services, (3) tourism, (4) business investment and innovation, and (5) productivity **[section 6]**
7. Are there other channels through which aviation connectivity might facilitate economic growth? What are they, and what evidence is there to support this? **[section 7]**
8. How effectively do you consider that the aviation connectivity of the UK may facilitate economic growth now and in the future? What risks and opportunities does it present? **[sections 6, 7, 8 and 9]**
9. How important do you consider connectivity for each of (1)-(5)? **[section 6]**
10. Are there other relevant policy issues which should be taken into account? **[section 7]**
11. To what degree can causality between connectivity and (1)-(5) be established? Are there any particular research methods that we should be looking at and why? **[section 3 and 6]**
12. What is the best approach to measuring the UK's aviation connectivity? **[section 8]**
13. Connectivity depends on many factors, such as number and frequency of flights and time and cost of travelling to passengers. Do you consider any of these factors to be of particular relevance to facilitating any of (1)-(5)? **[section 3]**
14. We have outlined a few different measures of connectivity in the paper. What alternative measuring approaches that we have not mentioned should we take into account? **[section 8]**
15. What kinds of impact do you consider capacity constraints to have on the frequency and number of destinations served by the UK? And, if any, are any particular kinds of routes or destinations likely to be more affected than others? **[section 9]**
16. To what extent do you consider that the need for additional connectivity may support the argument that additional capacity may be required? **[all sections]**