

ECONOMIC IMPACTS OF HUB AIRPORTS

July 2009



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CONTENTS

Executive Summary	4
1 Introduction	9
1.1 Overview	9
1.2 Methodology	9
1.3 Core economic concepts	9
1.4 'Hub' airports	11
2 Hub airports in the UK	13
2.1 Heathrow is the UK's passenger hub	13
2.2 Heathrow faces increasing competition	15
2.3 Summary	28
3 Immediate-term economic impact	30
3.1 Introduction	30
3.2 Scenarios/assumptions	31
3.3 Results	33
3.4 Conclusions	34
4 Longer-term, wider impact to the economy	34
4.1 Introduction	34
4.2 Quantifying productivity impacts	34
4.3 Employment	37
4.4 Quantifying imperfect competition benefits	37
4.5 Other wider benefits	37
4.6 Conclusions	37
5 Conclusion	39
5.1 Summary of economic impacts	39
5.2 Are these impacts unique to Heathrow?	39



As an island nation the ability to move people and goods effectively and quickly to and from these shores is of vital importance to British business. As a trading nation we rely on our ability to connect with the rest of the world.

Many of the industries in which we are globally competitive, such as electronics, pharmaceuticals, biotechnology, insurance and telecommunications, are dependent on aviation. No other form of transport can match aviation in its speed, efficiency and global reach. Airports are gateways to the world, vital for business activity, family and leisure travel.

However, in recent decades the ability of our major airports to continue to provide a first class service has been brought into question as capacity has become increasingly stretched. At our only major hub, Heathrow, the two runways run at near 99% capacity. Members continue to tell me that they are frustrated at the length of delays they are subjected to and complain about the user experience – itself a function of scarce capacity. As airlines continue to compete for limited slots the amount of destinations served has fallen while the regions have lost vital links to Heathrow and subsequently the rest of the world.

At a time of recession it has become acutely apparent how important connectivity is for the UK economy as businesses seek to develop new opportunities that will allow them to prosper. Yet without additional capacity at our major hub the UK will continue to fall behind its competitors. The age old phrase ‘time is money’ is apt as we look for solutions going forward. We must invest now to safeguard our economic future.

The British Chambers of Commerce has commissioned this report specifically to highlight the economic benefits of hub airports to the UK economy.

A handwritten signature in black ink that reads "David J. Frost".

David Frost
Director General
British Chambers of Commerce

- This report, commissioned by the British Chambers of Commerce and undertaken by leading economics and transport consultancy Colin Buchanan, examines the economic impacts, in relation to business users, of hub airports and of expanding Heathrow.
- The report examines the widely accepted link between UK economic growth and connectivity, the role of hub airports in delivering that connectivity, and the economic impact of removing current capacity constraints at Heathrow, the UK's only hub airport (Section 1).
- Hub airports allow airlines to offer a comprehensive global network. Because of Heathrow's transferring passengers, UK businesses have access to more direct destinations, at higher frequencies and lower priced fares.
- But scarce capacity means that over the past 20 years Heathrow has fallen from 1st in Europe to 5th in terms of destinations served, the number of UK regional cities it serves has fallen from 21 to 6 and Heathrow has fallen behind its rivals in serving the growing BRIC (Brazil, Russia, India, China) economies.
- Adding capacity at Heathrow would deliver more destinations, greater frequencies and fewer delays in the short-term; and make the UK more competitive for investment, particularly from emerging markets, and enhance productivity and connectivity in the longer term (Section 2).
- Using proven methodology and conservative assumptions, the report suggests that economic benefits would include £8.6bn-£12.8bn Present Value (PV)* in direct productivity plus £20bn (PV) in wider economic benefits (Sections 3 and 4).
- The wider economic benefits, valued at £20bn PV over 60 years, are higher than those found for major rail schemes such as High Speed 1 (£3.8bn PV) and even greater than the £10bn PV estimated for high speed rail to the North (Section 4).
- Investment in airport expansion would be borne by the private sector, whereas most rail infrastructure investments would be funded by the taxpayer.
- High speed rail would provide a good complement to any airport capacity expansion plan. But on its own, use of high speed rail would do little to alleviate the current capacity constraints at Heathrow, as eliminating current UK flights (except Belfast) would free up around 9.7% of slots if all air passengers transferred to rail.
- For every year that hub capacity expansion fails to happen, the economy loses £900m-£1.1bn. If a Thames Estuary hub took 20 years longer than Heathrow expansion, the UK economy would lose between £8.9 and £10.9 billion* (Section 5).

* PV (Present Value) is a standard method for expressing and comparing the outcome of specific investment decisions. We calculate benefits year-on-year for the duration of the appraisal period and then express them as a single PV. The PV is a way of expressing a stream of costs or benefits as a single value. It takes the benefit for each year and discounts it to what that benefit would be worth at today's prices. Discounting allows for depreciation in the value of money over time - so for instance, a benefit of £100 this year is worth more than £100 in ten years' time. The discount rate that has been applied is in line with government appraisal guidance.

CONTEXT

The British Chambers of Commerce (BCC) is the national body for the network of Accredited Chambers of Commerce across the UK, serving not only the Chambers and their member businesses but also the wider business community.

On 15 January the Secretary of State for Transport confirmed the Government's support for a third runway at Heathrow Airport, the UK's only hub airport - by any standards a controversial decision. Given the importance of

high quality transport infrastructure to British business and the wider economy, and the intensity of the political and media debate surrounding the proposed third runway at Heathrow, the BCC is concerned about the lack of understanding of the economics of hub airports, and the economic impact of expanding the UK's hub at Heathrow.

This report therefore aims to fill this knowledge gap, adding a fuller understanding of economic impacts of hub airports to the context for future planning.

INTRODUCTION

In April this year, the British Chambers of Commerce (BCC) commissioned Colin Buchanan, a leading economics, transport planning, planning and urban design consultancy to examine the direct and indirect economic impacts of hub airports to the UK in relation to business users and investigate the role of hub airports in economic growth, both generally and more specifically within the UK. The report was funded by members of Future Heathrow, a broad-based coalition of business, trades unions and the aviation community.

Section 1 sets out the basic methodology and background core economic concepts, explaining the evidence relating connectivity to economic development and more specifically the role of air connectivity and 'hub' airports in economic growth. It then explores the direct and indirect economic impacts of hub airports to the UK in relation to business users (1.2). The research centres on understanding the transport and wider economic impacts of hub airports, and draws on Colin Buchanan's methodology devised for calculating the wider economic impacts of Crossrail, in line with Department for Transport (DfT) guidance (1.2.1).

High quality transport infrastructure is a prerequisite for sustained economic growth and for maintaining competitiveness in a developed economy. International competitiveness is driven by productivity growth which is underpinned by trade, foreign investment and innovative activity, all of which are facilitated by connectivity. The most innovative and productive firms tend to be those that are competing at a global level (1.3.2). The Eddington Report set out the evidence for the link between investment in transport and economic growth: the return from investment in transport infrastructure is a 0.2% increase in GDP for a 1% increase in public capital stock, in a developed country (1.3.9).

As countries' economic performance ebb and flow, it is important for the UK's economy that connectivity is maintained with the fastest growing economies, for example the 'BRIC' economies – Brazil, Russia, India and China (1.3.14). Air freight further facilitates trade by enabling businesses to operate in a more flexible and time-sensitive way (1.3.17). Global connectivity is particularly important for air intensive sectors: high-tech, pharmaceuticals,

financial and business services, which place significant value on face-to-face relations, rapid delivery of high value goods, and supporting a mobile workforce (1.3.18).

Air connectivity increases with the number of destinations served and the frequency of flights along these routes. This in turn will make a location more attractive to foreign investment and increase the potential for business efficiency, and ultimately generates a virtuous cycle of connectivity and economic growth. Connectivity is generated by an airport's ability to attract passengers, but also the efficiency and availability of routes provided to international locations - mirrored by the growing complexity of air networks and the importance of hub airports for economic development (1.4).

The key benefit of a hub airport is that it can sustain a comprehensive and far wider network at a higher frequency of service than would be possible at a point-to-point airport. Transfer passengers make direct routes to many destinations sustainable, a pattern found across all major international hubs: 35% of Heathrow's passengers are transferring, 53% of Frankfurt's (Main) and 45% of Amsterdam's (Schiphol). Because of Heathrow's transferring passengers, UK residents and businesses have access to more direct destinations, at higher frequencies and lower priced fares (1.4.5). By adding flight capacity at a hub, the connectivity impact is magnified compared to adding point-to-point capacity. Hub airports offer a better service, more destinations and greater frequencies, than would otherwise be offered if that airport were only meeting local demand.

HUB AIRPORTS IN THE UK

London's Heathrow Airport is the UK's only true hub. Heathrow handles more passengers annually than any other airport in Europe, just under 70 million, and nearly double the number of passengers as the next most heavily used UK airport, Gatwick (2.1.2). But over the last ten years, Heathrow has faced increasing competition from expanding European hub airports and its role in providing hub access for the UK's regions has fallen dramatically.

Heathrow is constrained and operating at 99% of permitted capacity. Operations at Heathrow were improved in 2008 with the opening of Terminal 5, but capacity remains constrained by

the two-runway system. Heathrow's European competitors all have three or more runways (2.2.6). In the 1990s Heathrow could offer more destinations than any other single European airport, it has now slipped to fifth (2.2.2). The number of British regional airports served from Heathrow has also fallen, from 21 to 7 and Amsterdam and Paris now serve more than double the number of these cities served by Heathrow (2.2.2).

Services at Heathrow are limited, landing slots are expensive, and airlines that would prefer to operate at Heathrow use other airports, including competing continental hubs. What has developed is a system in London of five airports, serving different purposes, but only Heathrow really serving intercontinental flights (2.2.7). Therefore London has fewer hub benefits than other cities, and Heathrow's flights have increased delays and reduced reliability and resilience compared to other hubs not operating at full capacity. UK residents and businesses suffer the cost and inconvenience of delays, and competitor airports are growing in strength. Passenger growth at Heathrow has trailed competitors in each year since 2004 (2.2.11). Consumers at Heathrow have also benefited less from the increased competition brought by liberalisation and new entrants. High slot prices form a huge barrier to entry (2.2.14).

A constrained hub prevents airlines from expanding their services. Removing that constraint can deliver a whole series of benefits, such as the following (2.3.2):

- Addition of new destinations
- Higher frequency of service
- Facilitate new entrants into the market
- Improve reliability of services
- Enable airlines to consolidate operations at a single airport
- Increased competition

In discussions with airlines they felt their present schedules were not frequent enough to allow them to compete on key business routes, nor were they able to add new routes to markets they felt were underserved such as China, India, Africa and Latin America. There was also a desire to restore UK domestic flights to act as

feeders to longer distance services. An expanded hub would also enable new entrants to provide new competing services. Heathrow serves fewer destinations and has fewer airlines than European competing hubs.

In the short-term, adding capacity delivers a better service at Heathrow, with more destinations, greater frequencies and fewer delays. In the longer-term, adding capacity makes the UK more competitive for investment, particularly in emerging markets that otherwise Heathrow would not be able to serve and productivity is enhanced more broadly by the enhanced connectivity and global competition (2.3.7).

IMMEDIATE-TERM ECONOMIC IMPACT

A model has been developed to estimate the benefits of a hub airport in terms of the time savings that would be brought about to business passengers. It is recognised by the DfT that increases in business time savings represent an increase in GDP, because "Faster and more reliable journeys in the course of work represent a productivity gain" (3.1.1). Delay, reliability, frequency, new international destinations and regional connectivity are all factors in the model (3.1.4). The model is based on London Heathrow, although the results give a broad indication of the benefits of increasing capacity at any constrained hub airport. The approach is to analyse the capacity effect of adding a runway at Heathrow and assess the benefits that are brought about under a range of scenarios, assuming that the increase in capacity is used in slightly different ways.

The year-on-year benefits have been estimated over 60 years (2015-74) taking into account a small increase in UK business trips over the first five years. The benefits over 60 years are then discounted and shown as a Present Value (PV), expressed in current prices (3.3.1). The results of the scenarios that have been assessed indicate that the economic impact of adding capacity at Heathrow would be in the region of £300m-£500m a year. Expressed as a PV over 60 years, not adding capacity at Heathrow would cost the economy between £8.6bn-£12.8bn in lost productivity (3.4.1).

Those figures only relate to the benefit associated with time savings – the wider

economic benefits are considered in Section 4. The results suggest that in general a substantial proportion of benefits derive from the potential increase in frequency to regional and international destinations. This fits well with the idea that better connectivity can be achieved via hub airports. In addition, well over 50% of the benefits would accrue to UK regions other than London (3.4.3).

LONGER-TERM WIDER IMPACT TO THE ECONOMY

Wider economic benefits (WEBS) are measured using the methodology Colin Buchanan developed for Crossrail and which was subsequently adopted by the DfT, and also using work undertaken by others regarding the wider economic benefits of airports and the aviation sector generally (4.1.1). WEBS seek to identify where current constraints on aviation might restrict productivity growth; reduce international competitiveness; and increase market imperfections (4.1.2).

In this section we have prepared what we believe are appropriate values for the wider economic benefits that would arise from a third runway at Heathrow. These are entirely additional to the value of the user benefits produced in Section 3.

- Productivity: we have adopted a cautious value at the bottom of the available published evidence. That produces values of lost GDP from not investing in a third Heathrow runway of £600m per annum or over £20 billion (PV) over 60 years (4.2.8)
- Employment: DfT figures suggest that by 2030 there could be an additional 10,000 direct jobs (4.3.3)
- Removing market imperfections: benefits of £30m per annum (4.4.3)
- There are other important issues which have not been valued, including the UK's failure to attract air links to the rapidly expanding BRIC countries and the importance of international labour to the UK economy (4.5.6)

CONCLUSION

This study has looked only at the economic impacts of hub airport expansion. It has deliberately not looked at environmental impacts and surface access. Within those particular terms of reference, the study concludes that:

- There are very substantial economic gains to UK plc that would be made from hub airport expansion. The report suggests that those benefits would include £8.6bn-£12.8bn (PV) in direct productivity and £20bn (PV) in wider economic benefits
- The wider economic values are based on the lowest findings of all recent work on Wider Economic Benefits of airports - there could be significant upsides
- An expanded hub airport would generate significant gains for the regions, especially those currently excluded from Heathrow due to a lack of capacity
- The wider economic benefits, valued at £20bn PV over 60 years, are higher than those found for major rail schemes such as High Speed 1 (£3.8bn PV), and even greater than the £10bn PV claimed for high speed rail to the North, and Crossrail's £15bn PV
- A key difference between investment in airport expansion and in high speed rail is that the cost of airport expansion and the risks associated with future revenue streams would be borne by the private sector, whereas rail infrastructure investments would be funded by the taxpayer (5.1.1)

It makes little difference in economic terms where a UK hub airport would be located (as long as it has good connectivity to London and the regions) and can be delivered in a timely and cost effective manner. The report has assessed the economic impacts of expanding Heathrow but there are other possibilities for having an expanded hub airport in London:

- Creating a new, three-runway (or more) airport east of London, in the Thames Estuary (or elsewhere)
- Expanding Stansted or Gatwick from one runway to three
- Using high-speed rail to link the London airports (allowing a collective hub)
- Linking the north to London airports with high speed rail (5.2.2)

In theory, creating a new hub airport for London would deliver the same benefit of capacity expansion as described for Heathrow, though it would take significantly longer to deliver and cost many times more to build both the airport

and the connecting infrastructure. The same is true for making Stansted or Gatwick the new key hub - the benefits would be the same, though the cost more and the time longer, given that both of these airports have further to go (from one runway to three) and current connectivity infrastructure would need upgrading.

High speed rail would provide a good supplement to any airport capacity expansion plan. But on its own, use of high speed rail would do little to alleviate the current capacity constraints at Heathrow, as eliminating current UK flights (except Belfast) would only free up around 6% of slots. High speed rail would provide a complementary benefit for the UK regions, but on its own does little to increase capacity. A high speed rail link between London airports would increase the ability to hub and

remove some duplication of services, freeing up some capacity. But linking, for example at-capacity Heathrow and Gatwick would deliver little in the way of additional capacity from efficiency gains.

Heathrow is therefore uniquely able to deliver the economic benefits found in the report. For every year that hub capacity expansion fails to happen, the trade off is an estimated £900m-£1.1bn (direct productivity and wider benefits). If expanding Stansted or Gatwick to be the lead hub were to take ten years longer than expanding Heathrow, the cost of that delay is estimated at £5.3bn-£6.4bn (PV) to UK plc. If constructing a new hub takes 20 years longer, the trade-off in lost benefit to UK plc is £8.9 and £10.9bn (PV) (5.2.4).

“The only reason for locating our main offices in Paddington was to be close to Heathrow. We need long-haul flights to be available throughout the day so that we can fly at the drop of a hat.”

Leading mobile telecommunications company

“Having access to a major hub airport is extremely important to us. We are constantly developing our business overseas, especially in markets outside of Europe such as Asia and Latin America.”

London Chamber of Commerce and Industry

1.1. OVERVIEW

1.1.1 This report, commissioned by the British Chambers of Commerce (BCC) and funded by Future Heathrow, investigates the role of hub airports in economic growth, both generally and more specifically within the UK.

1.1.2 While expanding airport capacity in the UK has been planned, in particular, the Government announced its support for a third runway at Heathrow on January 15, 2009, the economic impact of such an expansion has remained unclear. This report is to help fill this knowledge gap, adding a fuller understanding of economic impacts of hub airports to the context for future planning.

1.1.3 In the remainder of this section, the basic methodology and background core economic concepts are set out, explaining the evidence relating connectivity to economic development and more specifically the role of air connectivity and 'hub airports in economic growth. It then explores the direct and indirect economic impacts of hub airports to the UK in relation to business users, through the way in which airline passengers benefit, and the consequential effects of those passenger benefits. It does not address environmental impacts, surface transport or planning considerations, nor does it address the local economic impact of changes in airport activities nor the effect on airline economics.

1.1.4 The following sections assess:

- The state/role of hub airports in the UK, with discussion of current constraints
- The impacts of not improving hub capacity
- Economic impacts of hub expansion
- Overall conclusions

1.2 METHODOLOGY

1.2.1 This research centred on understanding the transport and wider economic impacts of hub airports, draws on our methodology devised for calculating the wider economic impacts of Crossrail, in line with DfT (Department for Transport) guidance.

1.2.2 The process included the following:

- Background literature review

- Data collection – CAA (Civil Aviation Authority) and Eurocontrol among the key data sources reviewed
- Interviews with air industry professionals, airlines and organisations such as NATS (National Air Traffic Services)
- Case study interviews with regionally-based businesses
- Development of capacity expansion impact model
- Evaluation of wider impacts

1.2.3 The analysis only quantifies the business benefits and excludes leisure and tourism impacts.

1.3 CORE ECONOMIC CONCEPTS

Connectivity matters to economic development

1.3.1 In this study, connectivity generally means transport connectivity, the ability to reach a wide range of places in a short amount of time. High quality transport infrastructure is a prerequisite for sustained economic growth and for maintaining competitiveness in a developed economy. International competitiveness is driven by productivity growth which is underpinned by trade, foreign investment and innovative activity, all of which are facilitated by connectivity. The most innovative and productive firms tend to be those that are competing at a global level.

1.3.2 There has long been recognition of the link between connectivity and economic growth. The growth of the world's major cities throughout history is clearly related to their position on the world's transport networks. Historically it was their position on overland trade routes, by navigable rivers, or in sheltered bays. More recently it has been the impact of canals (New York) or growth of suburban railways (London), while the recent growth of cities such as Dubai are linked to their place on the world's aviation network.

1.3.3 The economist Alfred Marshall in the 1890s set out that firms face three key transport costs: moving goods, people and ideas and that firms will locate where they can minimise these costs. This concept of transport costs takes into account not just the cost of travel but also the time taken, which is also influenced by uncertainty of that time. Good connectivity therefore depends on cost, time and reliability.

¹ Marshall, A (1890) *The Principles of Economics*. London: Macmillan.

1.3.4 Through the decades of further detailed international research since, this concept largely remains. Firms 'cluster' and 'agglomerate' in close proximity to each other because they gain core efficiencies through the ease of connectivity:

- Ease of recruiting skilled workers in larger, shared labour markets
- Knowledge-sharing through formal and informal communication
- Access to more competing suppliers
- Access to more potential customers

1.3.5 Places that facilitate connectivity, and implicitly, the above-listed efficiencies, are attractive to businesses. Connectivity creates efficiencies that make firms more productive, which in turn attracts more high-flying international businesses that have their choice of locations and starts a virtuous cycle of economic growth.

1.3.6 The fact that international businesses are willing to pay a large premium on rent and salaries in Central London, Manhattan, Tokyo and Paris is testimony of the impact that location has on business success. Well-connected locations are hugely important to businesses.

1.3.7 In particular, the knowledge-sharing element of connectivity is increasingly important, as innovation becomes a much sought-after input to economic growth. Innovation is linked to networking and knowledge-sharing and connectivity is a key facilitator of this process.

1.3.8 In the UK specifically, the Eddington Study² recognised the importance of connectivity in economic growth. It clarified the evidence for the historic link between investment in transport and economic growth and reported that the general consensus of research into the returns from investment in transport infrastructure is a 0.2% increase in GDP for a 1% increase in public capital stock, in a developed country. Whilst the European Council of Transport Ministers cite airport and port infrastructure as one of the critical success factors for economic growth.³

Person to person contact still matters

1.3.9 Information and communications technologies (ICT) have expanded greatly in recent years. Inexpensive telephone, email and video-conferencing technology are widely

available. But this has not meant the end of face-to-face business meetings; rather, common business practice still relies heavily on meeting in person and agreeing deals with a handshake to inspire trust and lay the foundations for good business relationships. We know that new ICT has added different layers to the means of communicating with business colleagues, but these technologies have not replaced their predecessors. We teleconference with and email our colleagues and contacts, but we also still telephone and meet with them.

1.3.10 Research confirms these observations. Studies show that many of the business contacts we email and telephone are within close physical proximity and that we tend to maintain electronic communication with people that we also meet or have met in person.⁴ We need initial in-person meetings to foster business relationships, though we may continue the relationships with phone calls or emails. These different layers of communication help build trust, which is a key element in the informal knowledge-sharing that leads to innovation.

1.3.11 Other studies explain that different modes are used for different types of knowledge-sharing across firms. While knowledge that can be reduced to straightforward data can be communicated through virtual communications, face-to-face contact is still crucial for communicating complex, tacit knowledge, which has also been called 'sticky' knowledge.^{5,6}

1.3.12 Even in our ever increasingly high-tech world, physical connectivity and face-to-face meetings have always played a key role in business relationships and knowledge-sharing. There is every expectation that this will continue.

Role of air connectivity in economic development

1.3.13 Air travel has grown rapidly in recent years as ideas, people and goods travel the globe, facilitating the kind of international connectivity and competition that breeds innovation and economic growth. As countries' economic performances ebb and flow it is important for the UK's economic performance that connectivity is developed and maintained with the world's fast growing economies. So in recent decades, links to South East Asia and the fast growing economies of Brazil, Russia, India and China (BRIC) have become increasingly important.

² The Eddington Transport Study: Sir Rod Eddington was jointly commissioned by the Chancellor of the Exchequer and the Secretary of State for Transport to examine the long-term links between transport and the UK's economic productivity, growth and stability, within the context of the Government's broader commitment to sustainable development. The Study was announced in Budget 2005 and reported on 1 December 2006 to accompany the 2006 Pre-Budget Report. See:

<http://www.dft.gov.uk/about/strategy/transportstrategy/eddingtonstudy/>

³ Transport and International Trade, Conclusions of Round Table 131, European Conference of Ministers of Transport, 2005

⁴ Imagawa 1996 in Peri 1998 Peri, G. (1998) Human Capital and Productivity in US Cities. Milan: Universita' Bocconi

⁵ Audretsch, 1998, p.21 Audretsch, D. (1998) "Agglomeration and the Location of Innovative Activity." Oxford Review of Economic Policy. Oxford: Oxford UP, p. 29.

⁶ Roberts, J. (2000). "From know-how to show-how? Questioning the Role of Information and Communications Technologies in Knowledge Transfer." Technology Analysis & Strategic Management, 1465-3990, Volume 12, Issue 4, 2000, Pages 429 - 443

“I know that for firms in Shanghai, for example, the speed of business means that people fly over to the UK for just a day of meetings and then return. If the flights to London were not direct, I am not sure people could do that and that would make London less attractive.”

Advisor to Chinese investors in the UK

1.3.14 Connectivity generates wider economic benefits for businesses, both through the efficiency of direct linkages and also by providing an environment that benefits businesses. In an international business world, air transport provides access to an international labour force, as well as customers, suppliers and knowledge-sharing around the world. These catalytic and ‘spillover’ effects, increase the efficiency and productivity of UK businesses, as well as attracting inward investment and high profile businesses to choose to locate in the UK over comparator areas.

1.3.15 Major national inward investment agencies always promote their international connectivity, particularly air connectivity, as a means to attract foreign direct investment. It is widely recognised that air connectivity plays a crucial role in recruiting foreign business.

1.3.16 Furthermore, the availability of air freight services further facilitates trade by enabling businesses to operate in a more flexible and time-sensitive scale, benefiting from services such as ‘just-in-time’ delivery.

1.3.17 Global connectivity is particularly important for those sectors characterised by internationalised, high-value products and services, dependent on mobile workforces and face-to-face relations. These include high-tech sectors, pharmaceuticals and financial and business services.

1.3.18 Air connectivity increases with the number of destinations served and the frequency of flights along these routes. This in turn will make a location more attractive to foreign investment and increase the potential for business efficiency and ultimately generates a virtuous cycle of connectivity and economic growth.

offer that level of service especially from the UK’s regions. In addition many passengers, especially business users, also want high levels of frequency. A weekly or daily point-to-point service is not going to be attractive to them. Airlines gave examples of where they had introduced a European point-to-point service in competition with services that required an interchange, but direct services are not necessarily better if they are infrequent – especially for business travellers.

1.4.2 As the traffic is not there to support direct point-to-point services between every point, traffic interchanges through a few hubs.⁸ Passengers who have access to a hub therefore benefit from a wider range of services and frequencies.

1.4.3 A typical hub airport operates on a wave principal. A wave of incoming flights will arrive within a 60-120 minute time frame connecting with a wave of out going flights 60 minutes later. This hubbing coordination allows for the maximum combinations of flight pairs to be offered, giving passengers a wider choice of destinations. Hubbing offers greater frequency (as well as destinations) for connecting passengers (for example, there are three direct flights from Edinburgh to New York a day, but by connecting at a hub airport, there are a further dozen flights a day). And for passengers local to a hub airport, the transfer passengers supplement local demand, allowing the hub to offer a wider range and frequency of direct services to and from the hub.

1.4.4 For example, at a simplistic level, transfer passengers at Heathrow lead to around a third more flights operated (the proportion of transfer passengers) giving increased accessibility to passengers flying from the UK. Therefore, UK passengers have a wider range of destinations and frequencies at Heathrow than if it were serving local demand alone. Table 1.1, which shows those scheduled long haul routes with the highest number of transfer passengers, helps to illustrate this point. Based on average aircraft size and load factors at Heathrow it is possible to calculate what proportion of an aircraft could be filled on a daily basis just with point-to-point passengers. Without transferring passengers, a daily direct service would not be possible to seven of the destinations listed (Beirut,

⁷ Airports Council International

⁸ In this report we compare figures for key hubs in Europe, which are determined to be: Frankfurt Main, Amsterdam Schiphol, Paris Charles de Gaulle, Madrid Barajas, and London Heathrow. Hereafter reference to the city alone refers to these airports.

1.4 ‘HUB’ AIRPORTS

1.4.1 There has been a long debate about the benefits of point-to-point versus “hub and spoke” networks in the aviation sector. Everyone would prefer to be able to fly direct from their point of origin to their final destination. However, as there are over 800 airports in the world handling more than 100,000 passengers each per year⁷ and thousands of smaller ones, it is never going to be possible to

Table 1.1: Scheduled long haul routes with highest proportion of connecting passengers at Heathrow 2005

Destination	Connecting		Total	Total passengers '000	Average daily plane supported by point-to-point demand only
	Domestic	International			
Beirut	1%	62%	63%	123	0.4
Tehran	1%	59%	60%	158	0.5
Phoenix	7%	47%	54%	191	0.7
Ottawa	11%	42%	54%	120	0.4
Nairobi	5%	48%	53%	492	1.8
Mexico City	0%	53%	53%	114	0.4
Montreal	5%	48%	53%	373	1.4
Accra	8%	43%	51%	119	0.5
Baltimore	2%	49%	51%	120	0.5
Calgary	19%	31%	50%	240	0.9
All Heathrow⁹	7%	31%	38%	67,852	--

CB (Colin Buchanan) calculations of data from: Connecting Passengers at UK Airports, CAA, 2008

Tehran, Phoenix, Ottawa, Mexico City, Accra and Baltimore), while direct services would be significantly reduced on the other three routes (Nairobi, Montreal and Calgary).

1.4.5 Much of the benefit of hub airports is therefore reliant on a high volume of transfer passengers, as they make direct routes to many destinations sustainable and this is true across all of the major international hubs. In the case of the UK for example, 35% of London Heathrow's passengers are transferring to other destinations, while in the rest of Europe, 53% of Frankfurt's and 45% of Amsterdam's passengers are making onward connections (BAA). Because of Heathrow's transferring passengers, UK residents and businesses have access to more direct destinations and at higher frequencies.

1.4.6 Some airports offer services aimed principally at the needs of their local catchment area. With few transfer passengers the range of destinations and frequencies offered is limited to that which can be supported by local demand.

1.4.7 An additional flight offered at such an airport therefore principally only benefits the catchment area of that airport. Whilst an additional flight offered at a hub airport provides benefits not only to its local catchment area but also to those areas that have connections to the hub airport.

1.4.8 Therefore, by adding flight capacity at a hub, the connectivity impact is magnified compared to adding point-to-point capacity. Hub airports offer more destinations and greater frequencies, than would otherwise be offered if that airport were only meeting local demand. Transferring passengers make these higher frequencies and increased destinations happen. And this type of service, particularly the high frequencies, is attractive to businesses.

1.4.9 Despite the rapid growth in point-to-point services from UK regional airports they will never be able to offer the range of destinations that can be offered from a major hub airport. Hence for a regional airport to have frequent access to a major and growing hub is of vital importance to UK regional economic performance.

"Good air links are vital to all of our offices across the UK - none of them are more than 30 minutes from a major airport."

FTSE 100 credit and consumer services company, employing 15,000 people worldwide

⁹ Long-haul destinations - 35% for all destinations

SECTION 2: HUB AIRPORTS IN THE UK

2.1 HEATHROW IS THE UK'S PASSENGER HUB

2.1.1 In terms of international access, the UK has traditionally benefited from excellent aviation links with the rest of the world. London's five airports between them serve some 400 destinations, more than any other European city can achieve. The rest of the UK has a network of regional airports providing a wide range of services to destinations principally in Europe. However, Heathrow is the only major hub airport,

(Table 2.1) with a third of its passengers being transfers and of those a quarter connecting from other UK origins or destinations. No other UK airport comes close in absolute numbers or percentage of transfer passengers.

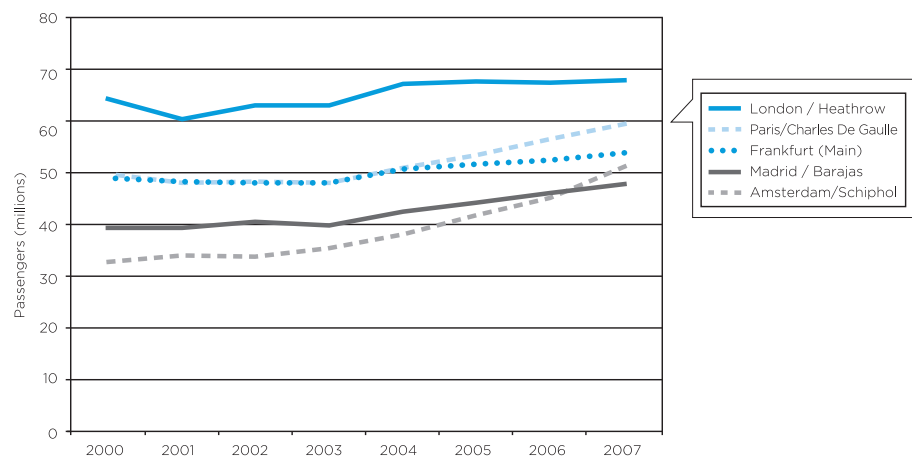
2.1.2 Heathrow also handles more passengers annually than any other airport in Europe, just under 70 million (Figure 2.1) and nearly double the number of passengers as the next most heavily used UK airport, London Gatwick.

Table 2.1: Transfer passengers at UK airports

Airport	Total passengers (millions)	Total passengers connecting		Passengers connecting with either origin or destination (or both) elsewhere in the UK	
		number	share of all passengers	number	share of all connecting passengers
Heathrow	66.9	23.5	35%	5.6	24%
Gatwick	34.5	4.5	13%	2.5	56%
Stansted	23.6	2.2	9%	1.0	45%
Manchester	21.6	0.6	3%	0.5	76%
Luton	9.7	0.4	4%	0.2	60%
Aberdeen	2.4	0.2	8%		
Birmingham	9	0.2	2%		
Glasgow	8.5	0.2	2%		
Edinburgh	8.3	0.1	1%		
Liverpool	5.4	0.1	2%		
London City	2.4	0.1	4%		

Source: Connecting Passengers at UK Airports, CAA, 2008

Figure 2.1: Passenger Traffic at Major EU airports



Source: EU Energy and Transport in Figures, European Commission, 2009

2.1.3 The nature of the destinations it serves is very different from other UK airports and it competes against other major European hubs which have similar characteristics in terms of destinations served. Ignoring national markets, which vary in size due to the different country's characteristics, Table 2.2 ranks the main EU airports in terms of the proportion of non-domestic passengers carried who are travelling outside the EU (broadly similar to 'long-haul' service). Over 60% of Heathrow's international passengers are travelling outside the EU, which is marginally higher than Frankfurt, 8 percentage points higher than Paris and 19 percentage points higher than Amsterdam. This compares with London Stansted, which is principally a point-to-point airport and where only 8% of passengers are travelling outside the EU. London Gatwick has strong levels of passengers travelling outside the EU (40%), but this is dominated by leisure routes.

2.1.4 Heathrow's network of long-haul routes are supported by transfer passengers as shown in Table 2.3 with 38% of its passengers transferring.

2.1.5 Heathrow's high proportion of transfer passengers continue to bring to London and the UK a wider range of direct destinations and higher frequencies than London would otherwise have, as indicated in Table 1.1. Some destinations are only able to be served because of the additional demand from transferring passengers; others would have significantly decreased frequency without transfer passengers.

Table 2.2: Passenger numbers by destination by airport

	Total	Proportion of non-domestic passengers travelling outside the EU
London Heathrow	67,852	61%
Frankfurt/Main	53,854	57%
Paris/Charles De Gaulle	59,550	53%
Paris/Orly	26,416	49%
Amsterdam/Schiphol	47,757	42%
Milano/Malpensa	23,632	42%
London Gatwick	35,166	40%
Madrid/Barajas	51,208	39%
Munchen	33,813	37%
Roma/Fiumicino	32,404	34%
Barcelona	32,743	19%
London Stansted	23,759	8%

Source: Air passenger transport in Europe in 2007, Eurostat, 2009

Table 2.3: Traffic connecting onto scheduled long-haul flights at Heathrow 2005

	Connecting passengers by connecting flight				Terminating Passengers	Total Passengers
	Domestic	Short-haul International	Long-haul International	Total		
millions	2.2	5.9	3.6	11.8	19.0	30.8
%	7%	19%	12%	38%	62%	100%

Source: Connecting the continents – long-haul passenger operations from the UK, CAA, 2005

“Whilst big airports like Manchester are important for the north, if we’re talking a world hub, then Heathrow is the UK’s only option.”

Northern Way, partnership for the three northern Regional Development Agencies (Yorkshire Forward, Northwest Regional Development Agency and One North East)

2.2 HEATHROW FACES INCREASING COMPETITION

2.2.1 Over the last ten years, Heathrow has faced increasing competition from expanding European hub airports and its role in providing hub access for the UK's regions has fallen dramatically.

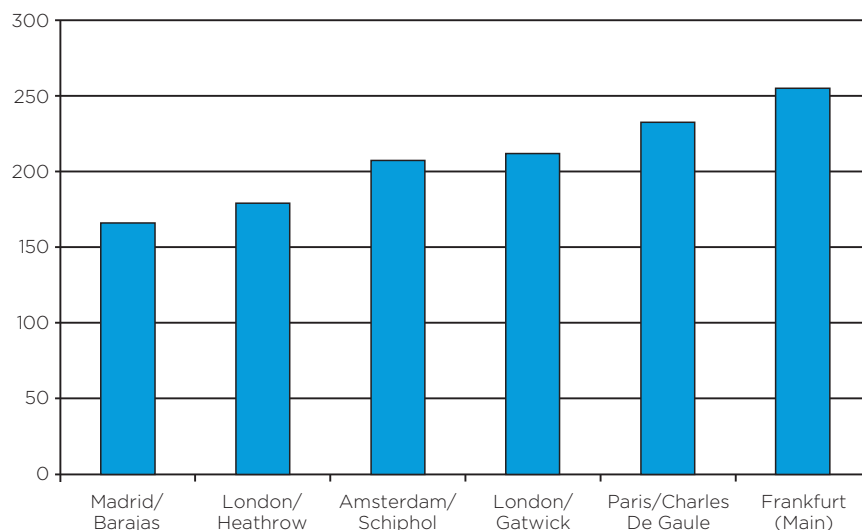
Growth constrained

2.2.2 Heathrow is capacity constrained, so there has been little expansion in services, while competing European hubs have increased their offer. Heathrow offered more destinations than any other single European airport in the 1990s, but as Figure 2.2 shows, it has now slipped to fifth behind Frankfurt, Paris, Amsterdam and even Gatwick (although about 40 of Gatwick's destinations are served by charter services). Since 1990, Heathrow has lost about 40 destinations. The number of British regional airports served from Heathrow has also fallen, from 21 to 7 (two of which are in Belfast). But Heathrow's loss has been the continent's gain. Amsterdam and Paris now serve more than double the number of British regional airports served by Heathrow.

2.2.3 As the map overleaf shows there are a large number of destinations in key world markets that are not served from Heathrow. While some are served from other UK airports the lack of easy interchange to some of them makes it more difficult for UK regions to access many of these locations.

2.2.4 Scarce capacity at Heathrow results in high prices for landing/take off slots. These high prices result in greater pressure to generate higher levels of revenue from those slots, one way being to use larger aircraft while another is to concentrate on long-haul flights which generate more revenue per slot than short haul. The average number of passengers per ATM is far higher at Heathrow than at competing airports. Figure 2.3 shows that while the number of passengers per movement is broadly similar at other European major hubs, at Heathrow it is on average a third higher. While Table 2.2 highlighted the greater proportion of long-haul passengers at Heathrow than other European hubs. So Heathrow's scarce capacity has led to a network that concentrates on a relatively few high density long-haul routes compared to competing hubs which have a much more balanced range of destinations.

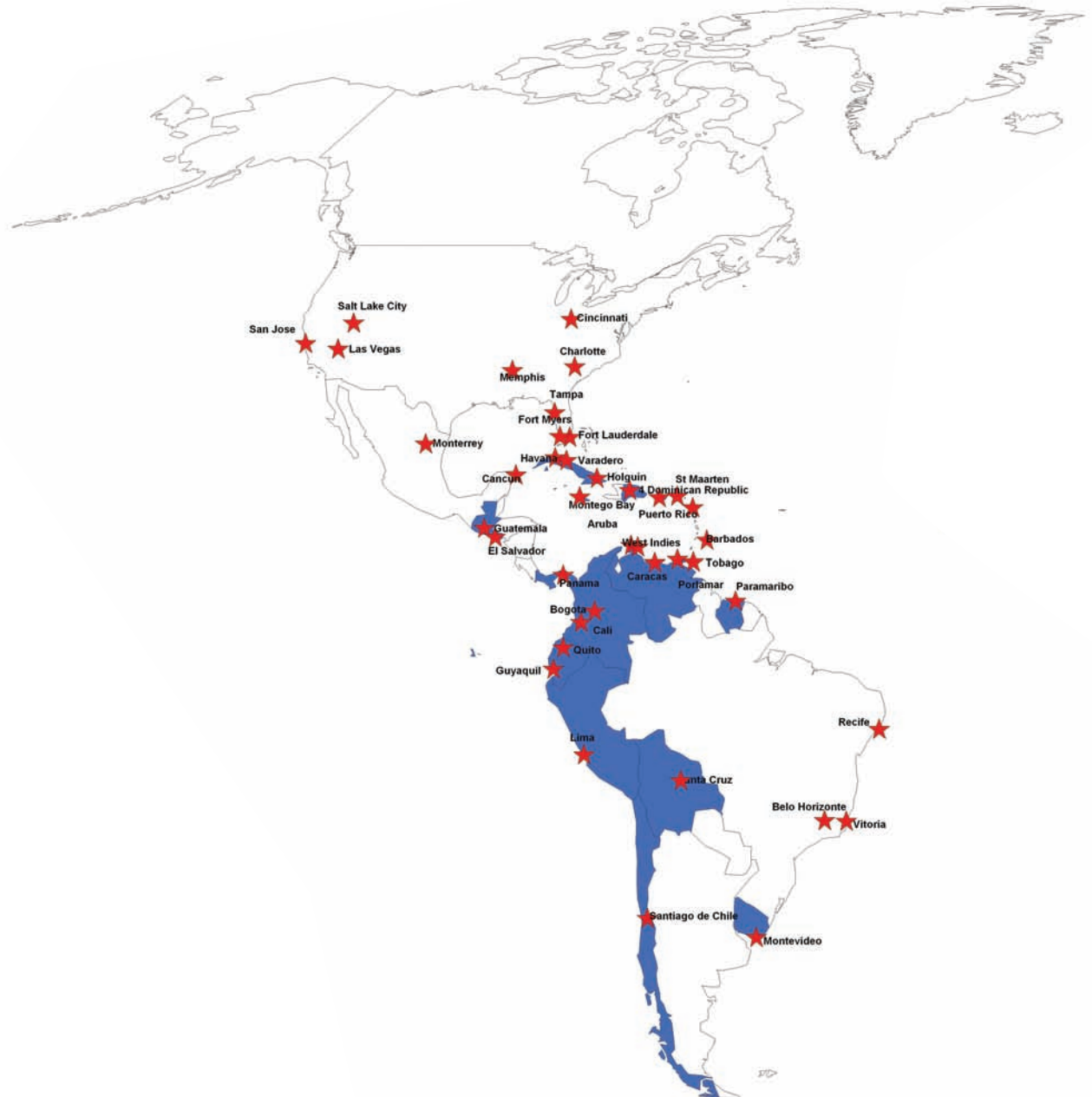
Figure 2.2: Number of Destinations served from European Airports 2009



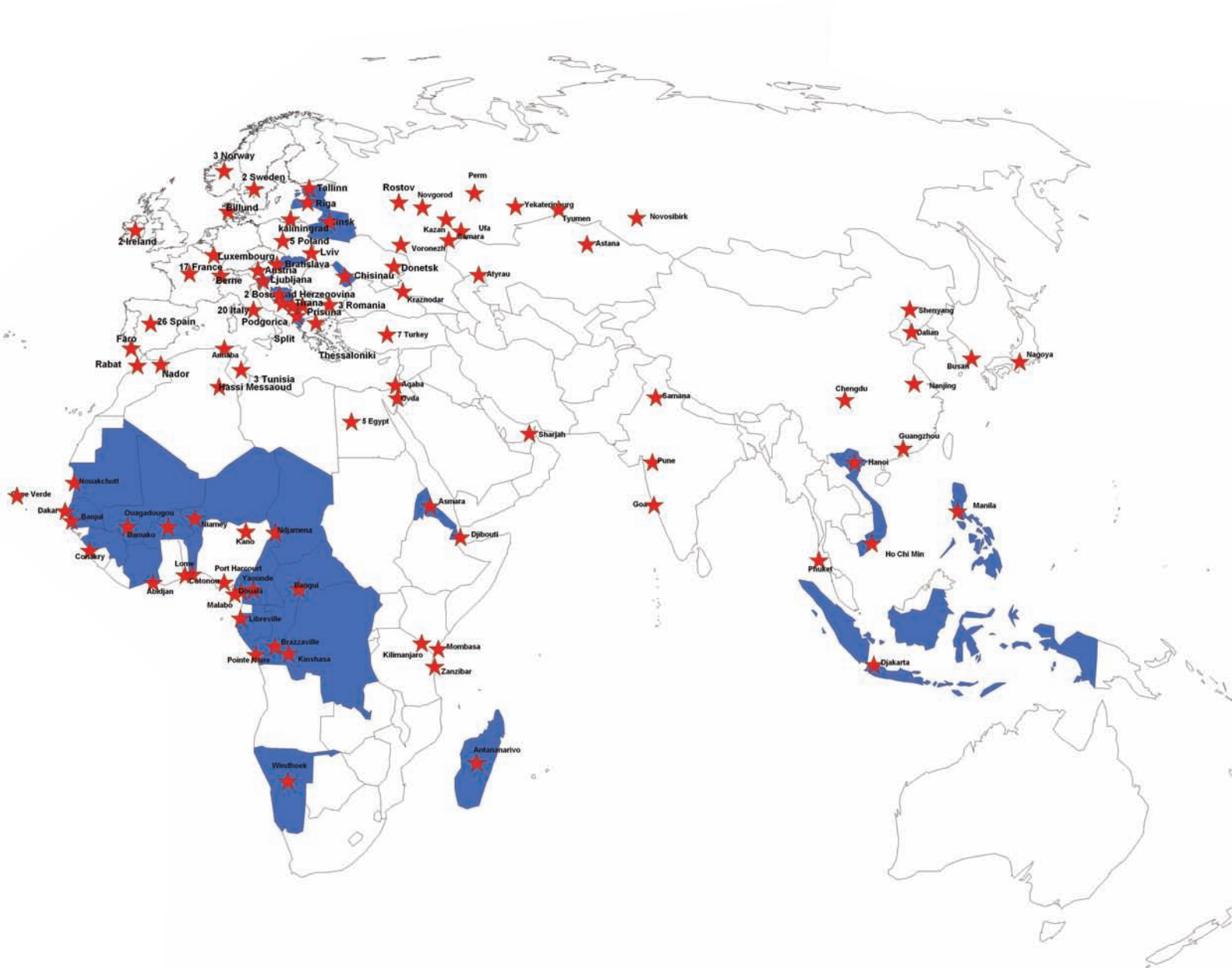
Source: BAA

SECTION 2: HUB AIRPORTS IN THE UK

Destinations served by main European hubs but not served from Heathrow at January 2009



Source: BAA





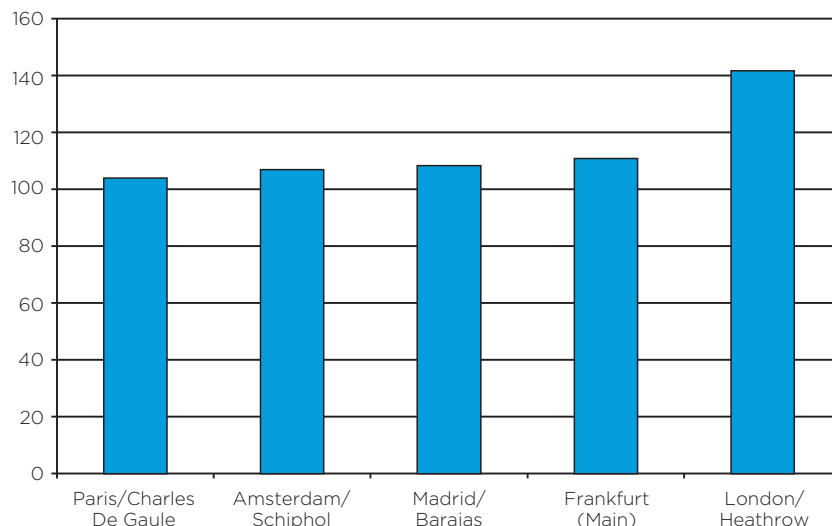
	Countries not served by LHR
	Cities not served by LHR

Figure 2.3: Average number of passengers per air transport movement



Source: CB calculations using EU Energy and Transport in Figures, European Commission, 2009

“Heathrow is losing its status as major hub because the regions are being forced to become reliant on Amsterdam.”

Northern Way, partnership for the three northern Regional Development Agencies (Yorkshire Forward, Northwest Regional Development Agency and One North East)

2.2.6 As demand for services grows, a constrained airport is unable to add new destinations or higher frequencies on existing routes without dropping other services. This is what has occurred at Heathrow. New destinations have been added at the expense of mainly domestic and short-haul destinations. To be attractive for business travellers, services on these latter routes need to be frequent. If frequencies are reduced, a vicious circle arises of lower frequencies, resulting in a less attractive service to users, precipitating further service reductions, until the route is dropped altogether. Without these feeder routes marginal long-haul services are unable to be supported. So the airport provides highly frequent services on a smaller number of heavily trafficked routes.

2.2.7 Heathrow is currently operating at 99% of permitted runway capacity. Operations were improved in 2008 with the opening of Terminal 5, but capacity remains constrained by the two-runway system. Heathrow’s European competitors all have three or more runways (Table 2.4) and are typically running at 70-75% of capacity.

2.2.8 Because of this constraint, services at

Table 2.4: Number of runways at leading European airports

Airport	Number Of Runways
Amsterdam / Schiphol	5 (though not all used simultaneously)
Paris / Charles De Gaulle	4
Madrid / Barajas	4
Frankfurt (Main)	3 (4 by 2012)
London / Heathrow	2

Heathrow are limited, landing slots are coveted and expensive and airlines that would prefer to operate at Heathrow are forced to serve other airports, which are not always in the UK. What has developed is a system in London of five airports, serving different purposes, but only Heathrow offering a substantial number of intercontinental flights and serving as a large-scale hub.

2.2.9 Operating at 99% of capacity has immediate and longer-term impacts:

- In the **immediate-term**, London has fewer hub benefits than it would if it could accommodate all the flights that want to use

Heathrow and if it could more readily accommodate better hubbing 'waves' of landing and take-off to improve connections. It also means that Heathrow's flights have increased delays and reduced reliability compared to other hubs not operating at 99% of capacity. When operating at full capacity there is no available slack and any perturbations in service are difficult to recover from and can have knock-on effects for the whole day;

- In the **longer-term**, there can be little increase in connectivity at Heathrow. Any new destinations or increased frequencies come at the expense of another destination already being served. This is already seen with the loss of domestic services. Heathrow can generally trade-off connectivity, rather than build on it, while competitors continue to build their connectivity.

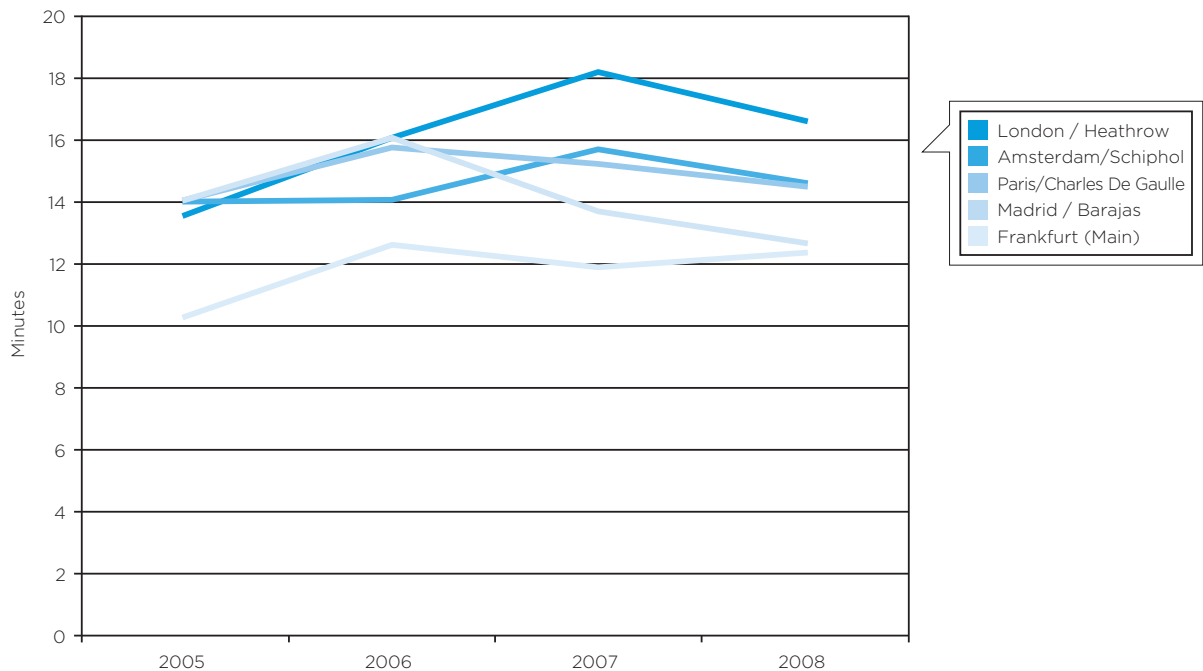
2.2.10 The difficulties with immediate-term delays at Heathrow are already clear. Figure 2.4 and Figure 2.5 show average delay on departure and arrival at Heathrow compared to competing airports. For departure, the average flight at Heathrow experiences nearly 17 minutes of delay,

which is two minutes longer than the average departure at Amsterdam and Paris and about four minutes longer than at Frankfurt and Madrid. On average, an arriving flight at Heathrow can expect nearly 18 minutes of delay, which is about 4-8 minutes more than competitors. Research shows that there is a relationship between the extent of airport capacity being utilised and delay. So as competing airports have provided new capacity performance has improved relative to Heathrow.

2.2.11 All this means that the UK's main hub offers a slower, less convenient hub service than competitors. UK residents and businesses suffer the cost and inconvenience of delays, as Heathrow becomes a less competitive hub.

2.2.12 The longer-term impact of a relative slip in connectivity is also beginning to evidence itself. Figure 2.6 shows how passenger growth at Heathrow has trailed competitors in each year since 2004. Heathrow is stagnating at handling just under 70 million passengers per year; competing airports are scheduled to surpass Heathrow's passenger numbers, with Frankfurt predicted to handle 80 million passengers annually by 2015.¹¹

Figure 2.4: Average delay on departure

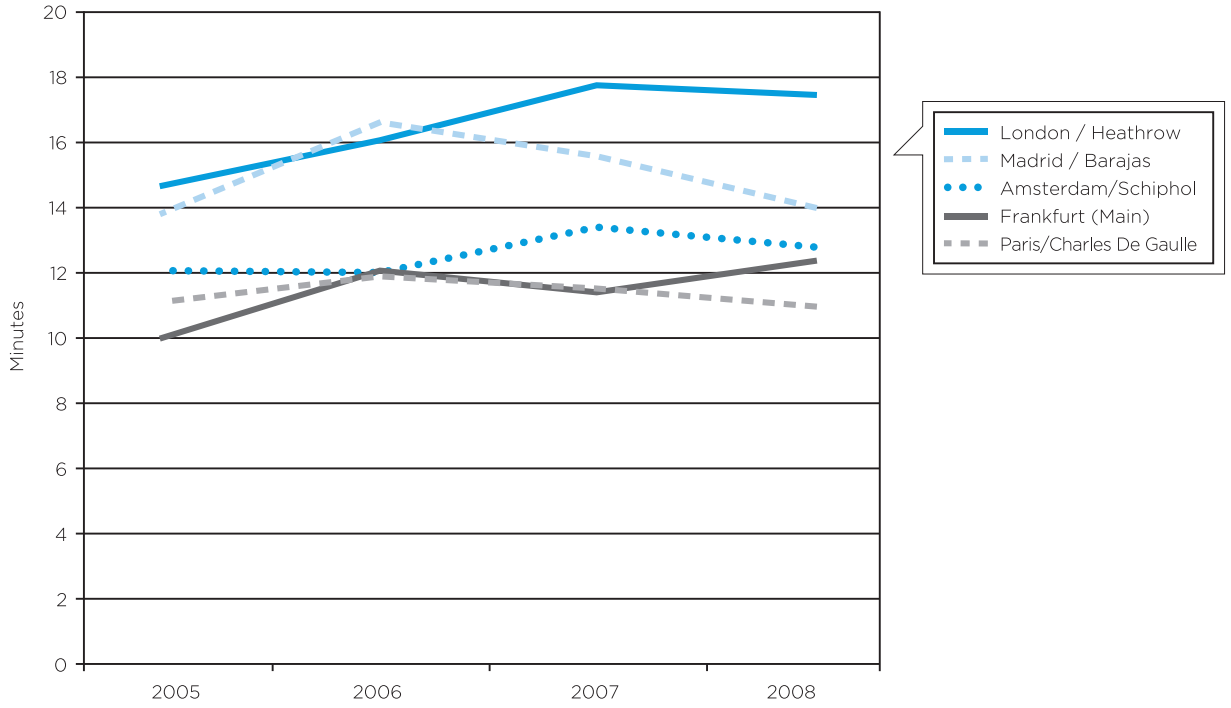


Source: Delays to Air Transport in Europe, Annual Digest 2008, Eurocontrol

¹¹ <http://www.airport-technology.com/projects/frankfurt/frankfurt7.html>, accessed June 2009.

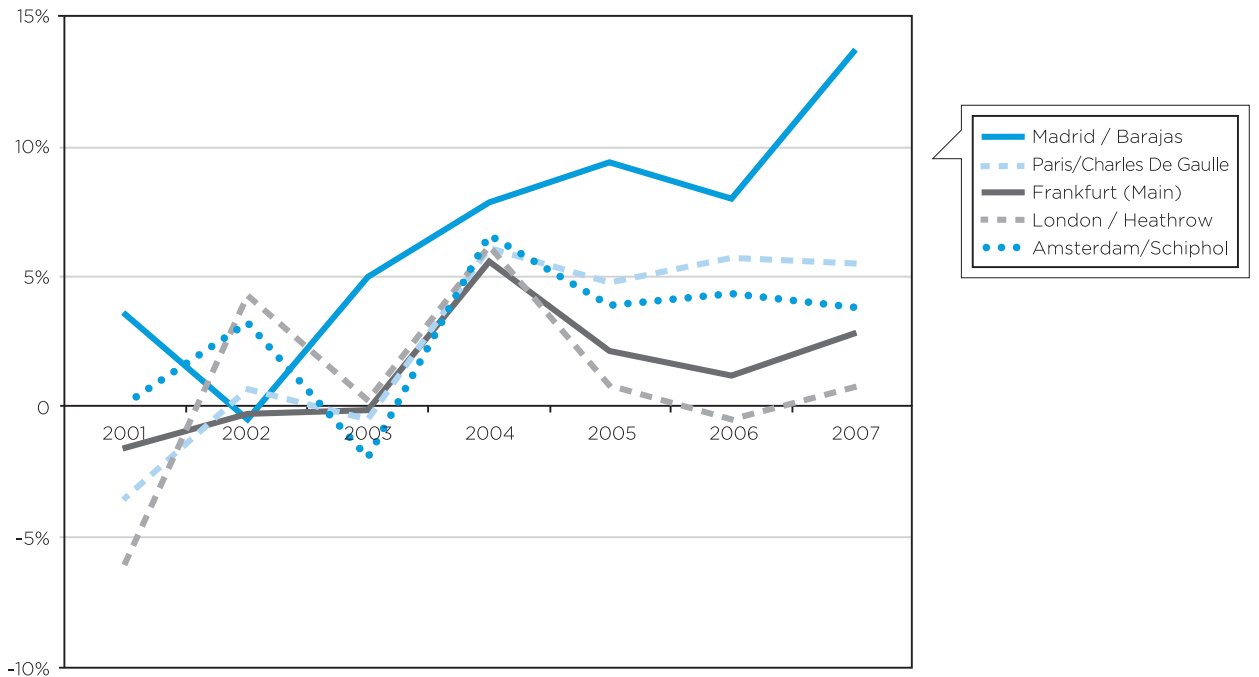
SECTION 2: HUB AIRPORTS IN THE UK

Figure 2.5: Average delay on arrival



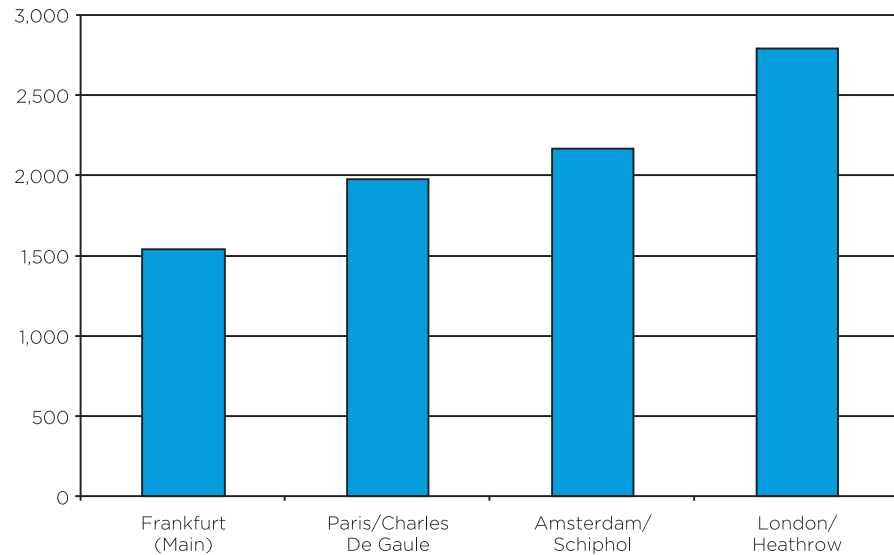
Source: Delays to Air Transport in Europe, Annual Digest 2008, Eurocontrol

Figure 2.6: Year-on-year passenger traffic growth at major EU airports



Source: EU Energy and Transport in Figures, European Commission, 2009

Figure 2.7: Average air transport movements per airline carrier (excl hub carrier)



Source: CB calculations using EU Energy and Transport in Figures, European Commission, 2009

Increased competition

2.2.13 Competing European hubs with additional capacity offer a number of advantages over Heathrow. Their capacity allows them to offer more efficient hub operations and ‘waves’ of take-offs and landings while also offering increased competition and services from a wider range of carriers.

2.2.14 The consumer has benefited considerably from increased competition in the airline sector due to liberalisation and new entrants. However, consumers at Heathrow have benefited less. Figure 2.7 shows the annual average movements per carrier at each major European hub excluding the major hub carrier. At Heathrow each carrier has almost twice the number of movements than at Frankfurt. There are fewer airlines operating at Heathrow than its major competing hubs and the airlines that do operate tend to offer more services. The implication is that smaller carriers that often drive innovation, new routes or compete with existing operators find it more difficult to enter the Heathrow market.

2.2.15 The barriers to entry at Heathrow are huge. BMI has 11% of the slots and values them in its balance sheet at £770m. Individual slots have

been sold for up to £25m depending on the time of day. The lack of new entrants on key routes keeps prices and yields high at Heathrow.

Less service to the UK regions

2.2.16 Of particular concern is the changing role of Heathrow in serving the UK regions. Services to most of the UK regional airports have ceased or declined. In 1996, 72% of UK regional passengers connecting onto long-haul flights connected in the UK. In 2005, that proportion fell to 60% (Table 2.5). With the subsequent loss of more regional flights into Heathrow since 2005, this proportion is likely to have fallen further.

2.2.17 So passengers travelling to or from the UK regions are increasingly being forced to travel via European hubs. The number of flights to an individual hub can be quite low and may be operated by a low cost airline requiring separate bookings and rechecking baggage. According to CAA data in 2005, 1.7m passengers from UK airports transferred to long-haul flights at European hubs outside the UK. If these passengers transferred to flights in the UK it would potentially support services to destinations that are not presently served from the UK.

SECTION 2: HUB AIRPORTS IN THE UK

Table 2.5: Proportion of passengers interchanging on to long-haul flights in the UK, by origin airport, 1996 and 2005

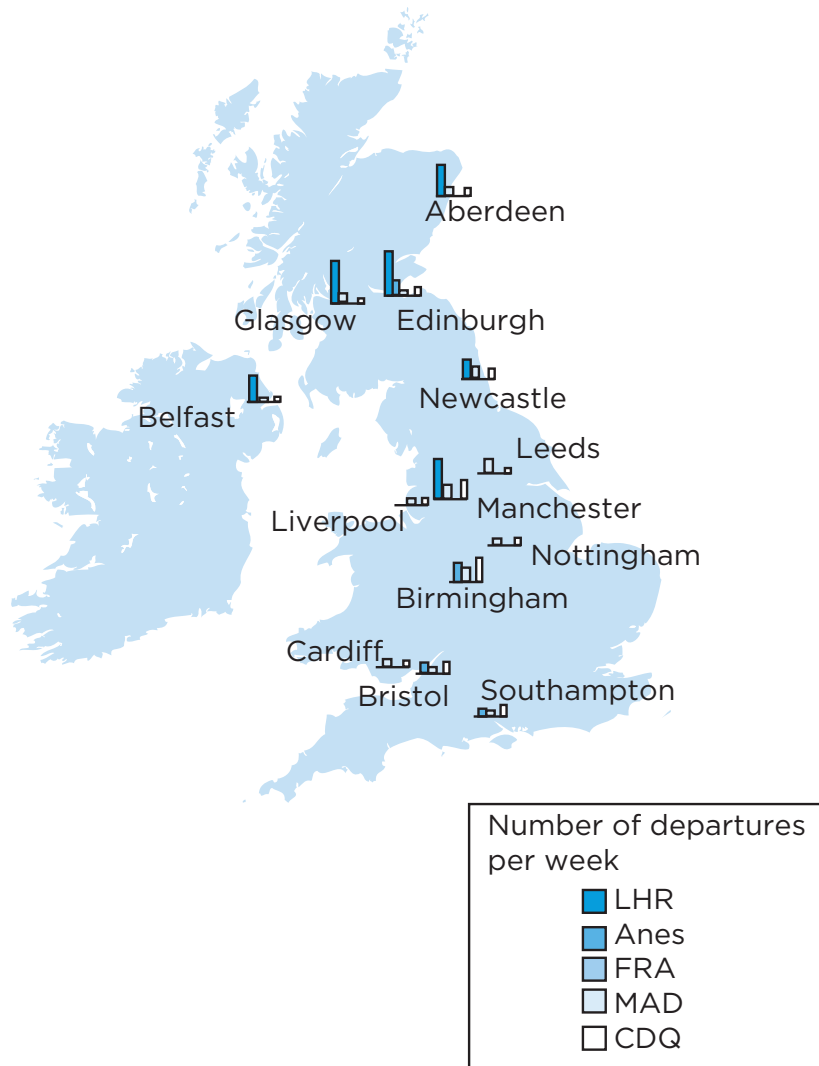
	1996	2005
Manchester	73%	54%
Glasgow	79%	75%
Edinburgh	83%	70%
Birmingham	0%	4%
Other UK regions	74%	65%
Regional total	72%	60%

Source: CAA

2.2.18 This shift in regional passengers transferring at competing European hubs has resulted in more flights from the regions to these hubs. But as shown in Figure 2.8 those airports that retain flights to Heathrow still have more flights to this hub than to competing European hubs.

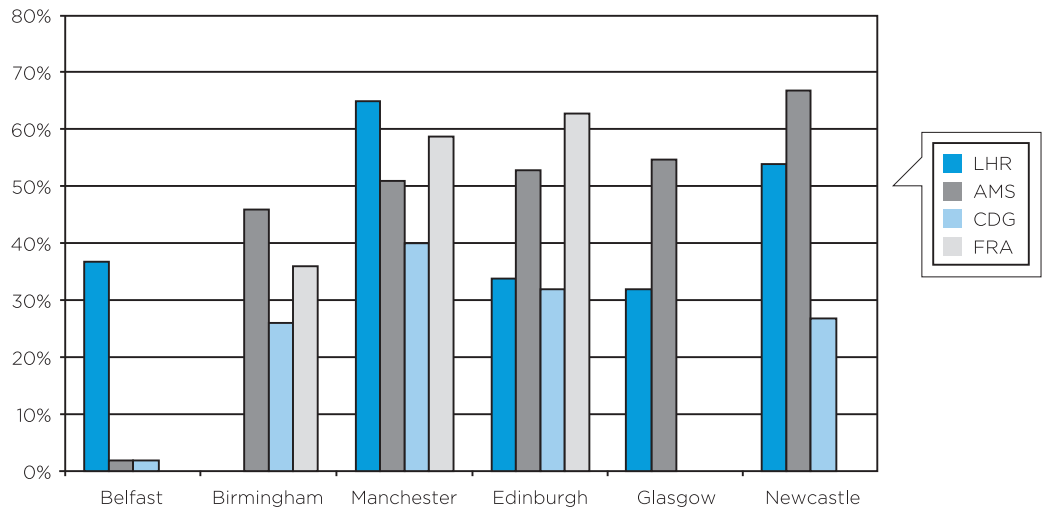
2.2.19 A high proportion of passengers from UK regional airports to the key European hubs, including Heathrow, are transferring to other flights. Nearly 70% of Manchester to Heathrow passengers, for example, are transferring to

Figure 2.8: UK Regional Flights to Major EU Hubs, 2008



Source: CB

Figure 2.9: Proportion of passengers travelling to EU hubs who are transferring



Source: CAA

other flights at Heathrow while the same proportion travelling from Newcastle to Amsterdam are also transferring (Figure 2.9).

2.2.20 However, generally relatively high frequency flights to Heathrow have been replaced by a similar number of flights to two-three continental hubs. Therefore, overall frequency declines. Table 2.6 through Table 2.10

demonstrate the possible connection times for Newcastle, Liverpool, Leeds and Teesside for different regions of the world as would be provided by a travel agent or on-line search. As these tend to exclude low cost airlines connections appear more limited than they may in reality be, but it provides a good indication of connectivity as presented to overseas travellers.

Table 2.6: Flight connections from Middle East (Dubai)

	Heathrow	Newcastle	Liverpool	Leeds	Teesside
Frequency					
Number of direct flights	10	1	0	0	0
Total number of connecting flights		22	14	7	10
Number of Connecting Flights (1 connection)		12	1	2	1
Number of Connecting Flights (2+ connection)		10	13	5	9
Dominant hub		London Heathrow	Amsterdam	London Heathrow/London Gatwick	Amsterdam
Journey Times					
Shortest Travel Time (hours)	7:20	7:45	11:40	11:50	12:05
Average Travel Time (hours)	7:30	15:16	17:40	15:14	15:530
Difference between Heathrow and regional airport averages		7:46	10:11	7:44	8:23

Source: CB based on Flight.co.uk

2.2.21 In the case of flights from the Middle East there are few instances of just being able to interchange once to reach those airports not directly served by Heathrow. Average journey times are 7-10 hours longer than the average

flight time to Heathrow or there are only 1-2 flights a day offering more reasonable total journey times. In the case of access to Leeds passengers have to interchange between Gatwick and Heathrow airports.

“We rely on air travel for business meetings and conferences on almost a daily basis. We need flights to be frequent.”

Martyn Pellew, Group Director, PD Teesport, based in Tees Valley

Table 2.7: Flight connections from Japan (Tokyo)

	Heathrow	Newcastle	Liverpool	Leeds	Teesside
Frequency					
Number of direct flights	5	0	0	0	0
Total number of connecting flights		17	23	24	19
Number of Connecting Flights (1 connection)		2	1	1	0
Number of Connecting Flights (2+ connection)		15	22	23	19
Dominant hub		London Heathrow	Amsterdam	Amsterdam	Amsterdam
Journey Times					
Shortest Travel Time (hours)	11:55	16:30	17:15	16:30	16:50
Average Travel Time (hours)	13:01	21:38	25:47	20:22	23:23
Difference between Heathrow and regional airport averages		8:37	12:46	7:21	10:22

Source: CB based on Flight.co.uk

Table 2.8: Flight connections from North America (Chicago)

	Heathrow	Newcastle	Liverpool	Leeds	Teesside
Frequency					
Number of direct flights	18	0	0	0	0
Total number of connecting flights		25	22	27	26
Number of Connecting Flights (1 connection)		8	2	4	2
Number of Connecting Flights (2+ connection)		17	20	23	24
Dominant hub		London Heathrow	Amsterdam	Amsterdam	Amsterdam
Journey Times					
Shortest Travel Time (hours)	7:30	10:35	14:35	10:40	10:55
Average Travel Time (hours)	8:04	14:49	16:18	14:52	15:06
Difference between Heathrow and regional airport averages		6:45	8:14	6:48	7:02

Source: CB based on Flight.co.uk

2.2.22 For Japan, again there are very limited connections requiring just one change and very long average journey times compared to travelling to Heathrow.

2.2.23 As European hubs have improved their flights to North America especially through Amsterdam, connections to most regional airports are comparable with transferring at Heathrow. This illustrates the fact that large

levels of UK transfer passengers support far higher frequencies of services from competing hubs than would otherwise have been the case.

2.2.24 South America is not particularly well served from Heathrow but UK regional airports do not have good links to Madrid or Lisbon which are the main European hubs serving the region. So there are few connections requiring just one change.

Table 2.9: Flight connections from South America (Sao Paulo)

	Heathrow	Newcastle	Liverpool	Leeds	Teesside
Frequency					
Number of direct flights	3	0	0	0	0
Total number of connecting flights		15	12	10	9
Number of Connecting Flights (1 connection)		3	1	1	1
Number of Connecting Flights (2+ connection)		12	11	9	8
Dominant hub		London Heathrow	Amsterdam	Amsterdam	Amsterdam
Journey Times					
Shortest Travel Time (hours)	11:10	14:15	17:10	17:00	17:30
Average Travel Time (hours)	11:17	18:08	22:31	18:58	20:21
Difference between Heathrow and regional airport averages		6:51	11:14	7:41	9:04

Source: CB based on Flight.co.uk

Table 2.10: Flight connections from Africa (Cape Town)

	Heathrow	Newcastle	Liverpool	Leeds	Teesside
Frequency					
Number of direct flights	6	0	0	0	0
Total number of connecting flights		15	19	17	19
Number of Connecting Flights (1 connection)		1	1	1	1
Number of Connecting Flights (2+ connection)		14	18	16	18
Dominant hub		London Heathrow	Amsterdam	Amsterdam	Amsterdam
Journey Times					
Shortest Travel Time (hours)	11:35	15:45	17:55	18:50	18:55
Average Travel Time (hours)	12:29	20:52	23:49	23:42	23:41
Difference between Heathrow and regional airport averages		8:23	11:20	11:13	11:12

Source: CB based on Flight.co.uk

SECTION 2: HUB AIRPORTS IN THE UK

2.2.25 Flights to South Africa tend to operate overnight and so are not spread out over the day making regional connections more difficult but again overall connections to Newcastle are better than other regional airports

2.2.26 In summary, UK regions are at a major disadvantage in terms of access from major world markets. This hampers the ability to attract inward investment and regional economic growth.

Less service to key world markets

2.2.27 With scarce capacity slots become difficult and expensive to obtain creating a major barrier to entry. This prevents competition, innovation and development of new routes by non-incumbent airlines.

2.2.28 The result is that the route network becomes ossified, meeting the needs of the travelling community of 20 years ago and not today. It is notable that of the four BRIC economies only India which has long historical links with the UK is served

better by Heathrow than the major European competing hubs. Even with India a lack of capacity has resulted in Air India¹² developing its European hub at Frankfurt and Jet Airways¹³ at Brussels (the later routing 700,000 passengers through the airport to and from India) with both citing the inability to obtain slots at Heathrow either at all or at the right times as the reason why they went elsewhere. While Indian papers have reported overtures from the Dutch government to Indian airlines to develop hub operations at Amsterdam.¹⁴

2.2.29 As airlines develop their global alliances there are pressures to concentrate services on key hubs. The Delta/Northwest merger has seen Amsterdam become their major European hub. There are also questions about BA's (British Airways) link up with Iberia and whether this will mean services to Latin America will be concentrated on Madrid to the detriment of Heathrow. Figures 2.10-12 show Heathrow's relatively poor market shares in some of the world's key market.

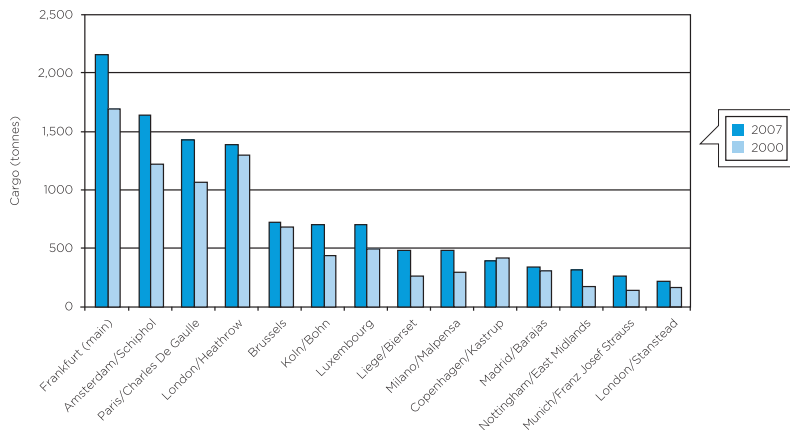
IN TURN, HEATHROW'S CHANGING ROLE IMPACTS AIR FREIGHT

Although often under-recognised, air freight carried by passenger planes ('belly hold') is an important element of most long-haul airlines business, typically generating between 10-30% of revenues per flight. It helps to underpin the commercial viability of many routes, especially those to Asia. Airlines can build up freight traffic quickly in new markets (whereas passengers tend to be slower to switch to new operators) to support a new route.

A very high proportion of air freight travelling through Heathrow is not UK-related. As with passengers, freight is being hubbed. This means reliability is just as important for freight as for passenger traffic as much of it is highly time-sensitive. Some of the hub traffic is brought in by truck from continental Europe while most is flown in and out again. This helps support long-haul services out of the UK that might not otherwise be sustainable without support of this freight traffic.

In 2000, Heathrow was the second largest freight airport; it has now slipped to fourth.

Freight tonnage handled by top European Airports

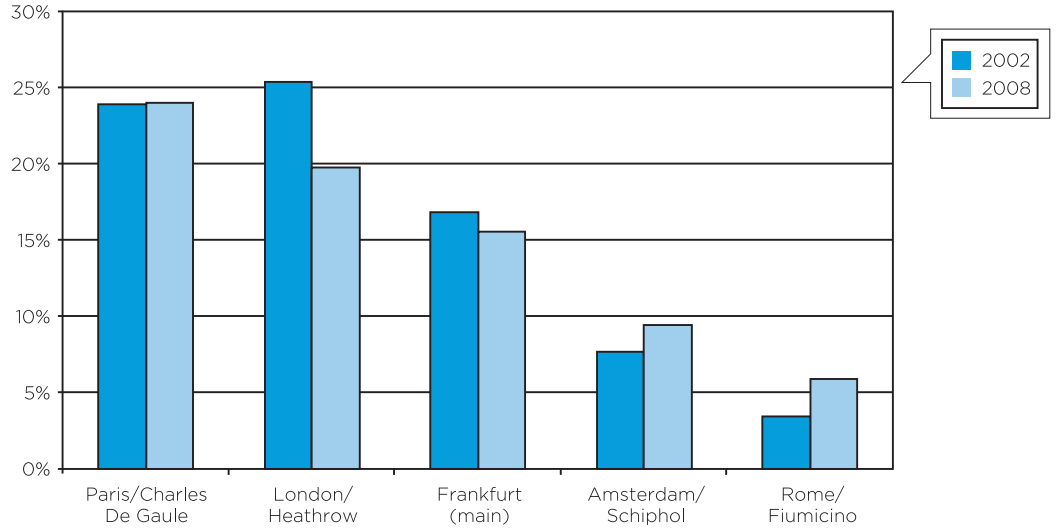


¹² Author's interview with Air India

¹³ CEO Wolfgang Prock-Schauer told ATWOnline that Jet chose BRU over London Heathrow, Paris Charles de Gaulle, Amsterdam and Frankfurt, which lacked attractive morning slots and offered cumbersome transfers, especially at LHR Thursday May 3, 2007

¹⁴ "The Dutch Government has invited airlines from India to set up their European hub at Schiphol airport in Amsterdam.", Feb 11 2008 <http://www.thehindubusinessline.com/2008/02/12/stories/2008021252311000.htm>

Figure 2.10: Market Share of Leading EU airports serving Japan



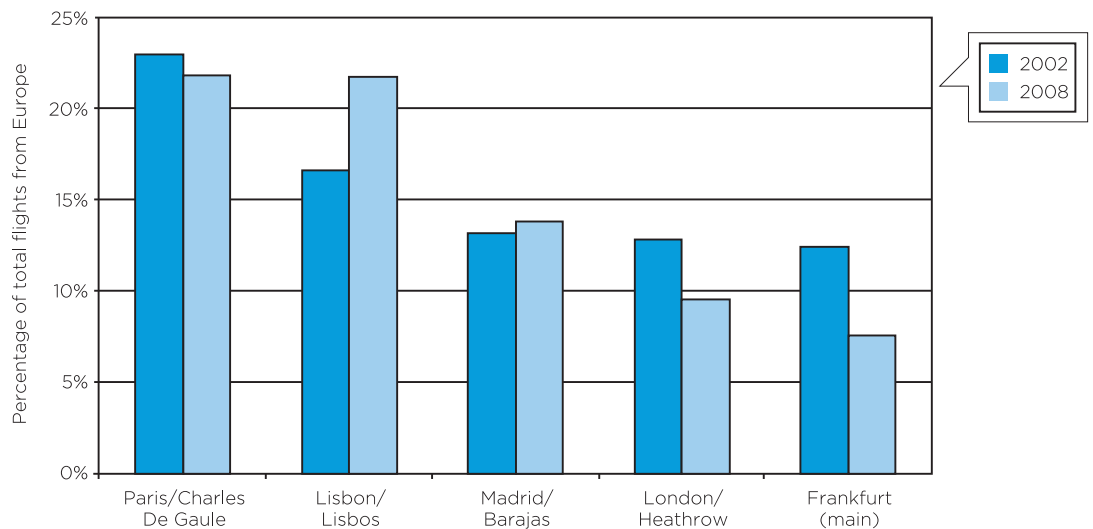
Source: CB calculations using OAG data

2.2.30 Figure 2.10 shows that Heathrow was the lead airport serving Japan from Europe in 2002, but now has lost its market share to Paris. Japan is a key investor into Europe and the UK was a key destination of Japan’s investment.

2.2.31 To Brazil, Heathrow is only the fourth largest player from Europe and its market share is on a downward trend (Figure 2.11).

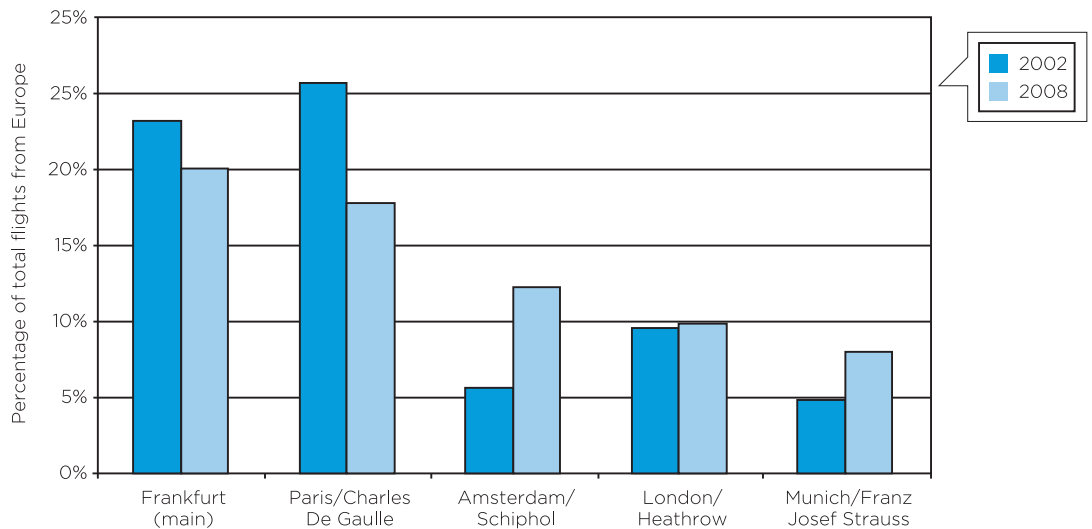
2.2.32 While to China, Heathrow has slipped from third to fourth and risks being overtaken by Munich (Figure 2.12).

Figure 2.11: Market Share of Leading EU airports serving Brazil



Source: CB calculations using OAG data

Figure 2.12: Leading EU airports serving China



Source: CB calculations using OAG data

2.3 SUMMARY

2.3.1 Heathrow remains the UK’s key hub airport and handles more passengers than any other European airport. However, Heathrow is operating at full capacity and is constrained by its two runways, which has immediate-term and longer-term implications. So Heathrow’s role is changing. Competing European hub airports have overtaken Heathrow in terms of total destinations, and Heathrow has lost market share to key markets, such as China. While UK regions can access continental hubs, flights are often split between two-three hubs, and this provides less frequency to any one hub. Service to the UK regions has declined, meaning Heathrow has a role as an international hub, but is not as widely accessible by those in the UK’s regions.

Benefits of expansion

2.3.2 A constrained hub prevents airlines from expanding their services. Removing that constraint can deliver a whole series of benefits, such as the following:

- Addition of new destinations (in the UK, this could include better connectivity to the regions)
- Higher frequency of service
- Facilitate new entrants into the market
- Improve reliability of services
- Enable airlines to consolidate operations at a single airport
- Increased competition

2.3.3 In discussions with airlines there was a desire both to add new destinations and to improve frequencies. A number of airlines felt their present schedules were not frequent enough to allow them to compete on key business routes. At the same time airlines wanted to add new routes to markets they felt were underserved. This included China, India, Africa and Latin America. There was also a desire to restore UK domestic flights to act as feeders to longer distance services.

“We would always choose Heathrow as a last resort because we’d have to go by rail or road to get there. Instead by using Teesside we have access to Amsterdam which has great connections.”

Engineering company based near Teesside Airport / Andy Hatton, Managing Director of Global Anodes UK Ltd

2.3.4 There are already examples of airlines that wanted to develop services from Heathrow but at present are unable to do so. An expanded hub airport would enable these new entrants to provide new competing services.

2.3.5 As previously noted Heathrow serves fewer destinations and has fewer airlines than European competing hubs. Increasing competition has been shown to bring substantial benefits to passengers in terms of reduced prices and higher quality service.

2.3.6 There are both short and long-term impacts of the constraint. In the short-term, adding capacity delivers a better service at Heathrow, with more destinations, greater frequencies and fewer delays.

2.3.7 In the longer-term, adding capacity makes the UK more competitive for investment, particularly in emerging markets that otherwise Heathrow would not be able to serve and productivity is enhanced more broadly by the enhanced connectivity and global competition.

BERLIN: THREE AIRPORTS; NO HUB, NO WORLD CITY

Before the Second World War, Berlin was the main European hub airport with flights to more destinations, including long-haul services, and Berlin was one of the world's leading world cities. With the reunification of Germany in 1989 Berlin was expected once again to become a leading world city. However, it was in the unusual position of having three airports. Lufthansa resumed services to Berlin, operating up to 74 flights daily to European destinations, as well as long-haul routes, such as New York and Tokyo. But the fractured nature of services across three airports meant that transfers often required a cross-city journey, so passenger numbers on major routes were lower than expected. Major carriers pulled out, including Lufthansa who chose Munich and Frankfurt as their hubs, over the capital. With a lack of major network carriers Berlin has become a key centre for low cost airlines which provide short-haul services with little interlining. In the 20 years since reunification Berlin has not become the world city that many expected and its place on the world aviation network has been fairly peripheral. Academic research has suggested a key reason for this has been the lack of large hub airport for city.**

“We use air travel on a weekly basis but we will always fly to Amsterdam or Frankfurt to catch a connecting flight rather than travel down to Heathrow. It’s much quicker and we don’t risk being delayed.”

NGF Europe, Japanese owned automotive company based in the North of England

** Missed Opportunities: The Restructuring of Berlin's Airport System and the City's Position in International Airline Networks, Heike C. Alberts John T. Bowen JR ; Julie L. Cidell Regional Studies, Volume 43, Issue 5 June 2009 , pages 739 - 758

3.1 INTRODUCTION

3.1.1 In this section we outline a model that has been developed to estimate the benefits of a hub airport in terms of the time savings that would be brought about to business passengers. It is recognised by the DfT that increases in business time savings represent an increase in GDP, because “Faster and more reliable journeys in the course of work represent a productivity gain”¹⁵. Wider economic benefits are considered in Section 4.

3.1.2 Our model is based on London Heathrow, in large part due to the availability of relevant data on passenger numbers and frequency of flights, although the results give a broad indication of the benefits of increasing capacity at any constrained hub airport.

3.1.3 The approach is to analyse the capacity effect of adding a runway at Heathrow and assess the benefits that are brought about under a range of scenarios, assuming that the increase in capacity is used in slightly different ways.

3.1.4 The following types of time saving benefit are included in the model:

- Delay: A report by London Economics¹⁶ estimated a relationship between the number of ATMs per runway and proportion of delays. This relationship has been applied to estimate the reduction in delay time that may come about as a result of increasing capacity at the hub;
- Reliability: Increasing capacity would also have an impact on the reliability of flight times and this has been included;
- Frequency: Increasing capacity would enable the frequency of flights to existing destinations to be increased, thus improving the convenience of the flight offer, which we estimate by a reduction in the deemed average wait times for a flight;
- New international destinations: Increasing capacity would enable flights to new destinations to be introduced, thus removing the need to interchange at another airport and therefore providing a time saving;
- Regional connectivity: There would be a benefit to passengers travelling from other UK airports to international destinations via Heathrow due to the impacts outlined above.

In addition this benefit would be increased by introducing connections between Heathrow and regional airports that are not currently served.

3.2 SCENARIOS / ASSUMPTIONS

3.2.1 It is assumed that in the base, or ‘Do Minimum’ scenario, there is no change to the present situation at London’s airports – capacity is not changed anywhere and passenger / flight numbers to each destination remain the same. In the ‘Do Something’ scenarios, an additional runway is introduced leading to an increase in total capacity at Heathrow of approximately 26% – an increase in annual ATMs from 480,000 to 605,000 in line with a DfT assumption¹⁷. The scenarios that have been tested use that additional capacity in the following ways:

■ Scenario 1:

- i) a set of ‘key domestic’ airports is defined; where if not already the case, it is assumed that the number of flights to and from these destinations increases to six a day;
- ii) where if not already the case, the number of flights to and from existing international destinations is increased to 1,500 a year (approximately two a day in each direction);
- iii) any remaining additional capacity is allocated proportionally to the international destinations with the most frequent existing number of flights (greater than 4,000 a year).

■ Scenario 2:

- i) same assumption as Scenario 1 regarding flights to and from domestic airports;
- ii) same assumption as Scenario 1 regarding increased frequency to existing international destinations that currently have a low number of flights;
- iii) introduce one flight a day in each direction to 20 new international destinations;
- iv) any remaining additional capacity is allocated proportionally to the international destinations with the most frequent existing number of flights (greater than 4,000 a year) – because of the new international destinations this increase in flights is lower than the equivalent for scenario 1.

¹⁵ Department for Transport (2005), Transport, Wider Economic Benefits and Impacts on GDP, <http://www.dft.gov.uk/pgr/economics/rdg/webia/webmet/hodology/sportwidereconomicbenefi3137.pdf>

¹⁶ London Economics (2008), Imagine a world class Heathrow, report commissioned by London First

¹⁷ Department for Transport (2007), Adding Capacity at Heathrow Airport

3.2.2 In order to test the sensitivity of these results to various changes to the assumptions, the following set of additional scenarios was examined:

■ **Scenario 3:**

- no increase in flights, instead use all of the capacity increase to focus on minimising delays and increasing reliability;

■ **Scenario 4:**

- similar to Scenario 1, but focus the increase in frequency on flights to and from regional airports and the busiest existing international destinations; and

■ **Scenario 5:**

- use all of the capacity increase to provide flights to new destinations.

3.2.3 Passengers per flight are assumed to be constant, so any new flights have the same load factor as existing flights. A ramp-up of demand is applied such that the number of business passengers increases over the first five years of the appraisal, remaining constant thereafter. For the flights to new destinations, the number of passengers per trip is assumed to be the same as the average passengers per trip for all existing destinations.

3.2.4 It is important to note that we are focusing on benefits to business trips, so impacts on passengers travelling for other purposes are excluded. In addition, foreign business trips are also excluded, so as to focus on UK time saving impacts as recommended in DfT appraisal guidance. So for transfer passengers, only those from the UK are included in the analysis. Journey purpose splits are sourced from CAA data.

3.2.5 The total value of the benefit under each heading is then quantified by using assumptions about the time saving for each category (see Table 3.1 for more detail) and valued using values of time from SERAS (the South East and East of England Regional Air Services model).

3.2.6 Table 3.1 provides details on some of the key assumptions that have been used.

3.3 RESULTS

3.3.1 The year-on-year benefits have been estimated over 60 years (2015 – 74), taking into account a small increase in UK business trips over the first five years. The benefits over 60 years are then discounted and shown in the tables below as a Present Value (PV), expressed in current prices.¹⁸

3.3.2 Table 3.2 shows the results for Scenario 1, where the main focus is on improving regional links and increasing the frequency of flights to and from existing international destinations.

3.3.3 These results suggest that the additional capacity at Heathrow may be worth approximately £8.6bn in business time savings to UK resident travellers as a PV over 60 years. This is the equivalent of almost £400m a year in undiscounted terms.

3.3.4 Table 3.3 shows the results for Scenario 2, where as well as improving regional links and increasing the frequency of flights to and from existing international destinations, flights are introduced to a set of new international destinations.

3.3.5 The overall benefit for Scenario 2 is similar to that for Scenario 1, although it can be seen that the frequency benefit for Scenario 2 is lower. Scenario 1 does not have any new international destinations whereas Scenario 2 has a benefit of over £1bn relating to this impact. The implication is that the economic benefits of new destinations or increased frequency are similar and should be left to the market to determine.

3.3.6 A summary of the results for Scenarios 1-5 is provided in Table 3.4.

3.3.7 Scenario 3, where there is no increase in the number of flights, shows a much lower benefit than any other scenario, though this is an extreme and highly unlikely scenario. This is because no benefits from increased frequency can be included and there is a limit to which delays can be reduced – it would never be feasible that delays could be removed altogether.

¹⁸ PV (Present Value) is a standard method for expressing and comparing the outcome of specific investment decisions. We calculate benefits year-on-year for the duration of the appraisal period and then express them as a single PV. The PV is a way of expressing a stream of costs or benefits as a single value. It takes the benefit for each year and discounts it to what that benefit would be worth at today's prices. Discounting allows for depreciation in the value of money over time - so for instance, a benefit of £100 this year is worth more than £100 in ten years' time. The discount rate that has been applied is in line with government appraisal guidance.

SECTION 3: IMMEDIATE-TERM ECONOMIC IMPACT

Table 3.1: Assumptions used in economic benefit analysis

Description of assumption	Value	Source
Potential increase in capacity if a runway is added at Heathrow	26%	Assumes an increase in total ATMs from 480,000 to 605,000 a year in line with a DfT assumption
Proportion of total potential capacity that gets used in the Do Something scenarios	86%	Assumes that the maximum potential capacity would be 702,000 ATMs a year
Total number of flights a year between Heathrow and each 'key' domestic airport (sum of inbound and outbound) in Scenarios 1 & 2	4,380	CB (Colin Buchanan) assumption - equivalent to 6 a day
'Key' domestic airports	Manchester, Glasgow, Edinburgh, Newcastle, Aberdeen, Leeds Bradford, Belfast City, Inverness, Jersey, Liverpool, Durham Tees Valley, Plymouth	CB assumption - other airports were also considered but these ones were felt to give a suitable coverage of UK regions
Total number of flights a year between Heathrow and each new international destination (sum of inbound and outbound) in Scenario 2	730	CB assumption - equivalent to 1 a day
New international destinations included in Scenario 2	Cancun, Lima, Salvador, Jakarta, Guangzhou, Shenzhen, Manila, Chengdu, Kunming, Nagoya, San Juan, Brasilia, Xian, Novosibirsk, Ho Chi Minh City, Xiamen, Kaohsiung, Guadalajara, Nanjing, Hanoi	The time saving per trip is more important than the exact locations for the purpose of the analysis. However, these destinations were chosen by looking at a list of the busiest airports in the world in the 'ACI World Airport Traffic Report' and choosing 20 of the busiest ones not currently served directly by Heathrow (with a bias towards China, India and South America)
Formula for estimating delays	$y = 0.0018x - 76.969$ Where y = proportion of delayed flights and x = ATMs per runway per quarter	London Economics (2008), Imagine a world class Heathrow, report commissioned by London First
Average delay per flight (Do Minimum scenario)	18 minutes	Weighted average based on 2008 passenger and delay data for individual destinations, from CAA website
Average reliability benefit per trip relative to Do Minimum scenario	1.9 minutes	Derived from calculations based on DfT guidance in WebTAG Unit 3.5.7
Frequency benefit per trip	Total time between flights is estimated for each destination and the midpoint is taken as the average wait time. However, a cap is applied such that there is a maximum benefit of 60 minutes per trip. This benefit is deemed to reflect the convenience of more frequent flights in the day and the wider choice	CB assumption - a cap is necessary otherwise the benefits for some of the less well served destinations would be unrealistic

SECTION 3: IMMEDIATE-TERM ECONOMIC IMPACT

Assumptions used in economic benefit analysis (continued)

Description of assumption	Value	Source
Benefit per trip for new international destinations	180 minutes	CB assumption – effectively assumes that there is a three hour journey time saving for passengers in the London area travelling to or from these destinations directly to Heathrow, compared with transferring at another hub airport. The ‘rule of half’ is applied because we conservatively assume that all trips consist of passengers who were previously making the journey via a different route (rather than completely new trip generation)
Connectivity benefit per interlining passenger from regional airports	30 minutes	CB assumption – represents the average interchange time saving for interlining passengers and is therefore only applied to the proportion of passengers that interchange at Heathrow. Those proportions are sourced from BAA
Value of time per hour, 2009 prices	UK Business (Domestic): 36.88 UK Business (International): 59.91	Source: SERAS provides 1998 values which are then uplifted in line with the Retail Price Index and suggested value of time growth from the DfT’s ‘WebTAG’ appraisal guidance. WebTAG does not provide base values of time for air passengers hence SERAS is used.
UK business proportion of trips from Heathrow by destination region	UK: 44.9% EU: 21.7% Rest of Europe: 22.9% Africa: 9.1% Middle East: 14.6% India / Pakistan / Sri Lanka: 11.6% Japan: 13.4% Rest of Asia: 12.4% Russia: 17.6% Australia and New Zealand: 6.6% North America: 12.8% Central America and Caribbean: 7.6% South America: 17.7%	CAA 2008 data – a percentage of the ‘transfer’ proportion is added to the UK business proportion to obtain the overall percentage
Growth of trips	Assume that the UK business proportion of trips starts at 5% lower than the values given above, reaching the values above after five years and constant thereafter	CB assumption
Discount rate	3.5% for first 30 years, 3.0% thereafter	DfT WebTAG guidance – standard values in transport appraisal

SECTION 3: IMMEDIATE-TERM ECONOMIC IMPACT

Table 3.2: Economic impact of additional capacity at Heathrow – Scenario 1

	Benefit (£m, 2009 prices, PV over 60 years)
Delay	1,300
Reliability	900
Frequency	5,600
New international destinations	0
Regional connectivity	850
Total	8,650

Table 3.3: Economic impact of additional capacity at Heathrow – Scenario 2

	Benefit (£m, 2009 prices, PV over 60 years)
Delay	1,250
Reliability	900
Frequency	4,700
New international destinations	1,300
Regional connectivity	850
Total	9,000

3.3.8 The results of the other scenarios show a total benefit of between £8.6bn and £12.8bn. An additional test involves capping the frequency benefit in Scenario 2 to 120 minutes instead of 60 and this also results in a total benefit within that range.

3.3.9 It is also possible to estimate the proportion of these benefits that are likely to accrue to London compared with the other UK regions. Our analysis suggests that for the two main scenarios presented in Table 3.2 and Table 3.3, approximately 42% of the benefits would apply to London and 58% to the rest of the UK.

3.4 CONCLUSIONS

3.4.1 The results of the scenarios that have been assessed indicate that the economic impact of adding capacity at Heathrow, expressed as a PV

over 60 years, would be in the range of £8.6-£12.8bn. Not adding capacity at Heathrow would cost the economy between £300m-£500m per year in lost productivity, depending on how the capacity is used.

3.4.2 Those figures only relate to the benefit associated with time savings – the wider economic benefits are considered in Section 4.

3.4.3 The results suggest that in general a substantial proportion of benefits derive from the potential increase in frequency to regional and international destinations. This fits well with the idea that better connectivity can be achieved via hub airports. In addition, well over 50% of the benefits would accrue to UK regions other than London, demonstrating the regional benefits that hub airports can bring about.

Table 3.4: Economic impact of additional capacity at Heathrow – sensitivity test results (£m, PV over 60 years)

	Scenario 1	Scenario 2	Scenario 3 - focus on delays	Scenario 4 - increase frequency focused on regions / busy destinations	Scenario 5 - focus on new destinations
Delay	1,300	1,250	2,450	1,300	1,150
Reliability	900	900	1,700	900	950
Frequency	5,600	4,700	0	6,200	0
New international destinations	0	1,300	0	0	9,850
Regional connectivity	850	850	0	850	850
Total	8,650	9,000	4,150	9,250	12,800

SECTION 4: LONGER-TERM, WIDER IMPACT TO THE ECONOMY

4.1 INTRODUCTION

4.1.1 The previous section described the direct user benefits accruing to business trips of hub airport expansion. This section considers the extent to which there might be economic gains beyond those captured by users themselves and sets out a range of values for those wider economic benefits (WEBS). In preparing this section we have drawn upon our experience of developing the approach to valuing WEBS for Crossrail, which was subsequently adopted by the DfT, and on work undertaken by others regarding the wider economic benefits of airports and the aviation sector generally.

4.1.2 WEBS represent links between transport impacts and the economy which are not captured through the traditional analysis of welfare or user benefits. In this work the WEBS seek to identify where current constraints on aviation might:

- restrict productivity growth;
- reduce international competitiveness; and
- increase market imperfections.

4.1.3 In looking at the WEBS of aviation we have had to take a view on what to include and what to exclude. Our rationale for these decisions is set out below:

Business Productivity – this is the key element of WEBS. Certain studies separate out impacts on particular characteristics such as inward investment and economies of scale, but a measure of productivity clearly includes all of those impacts

Direct and Indirect employment – airport expansion would be a private sector investment generating new jobs both directly and indirectly. Those should be included within the economic impact

Imperfect Competition – the DfT recognise that in imperfect markets time savings to business trips undervalue the additional output generated and recommend a 10% factor to be added to those benefits

Tourism – this study takes no account of impacts on leisure travel or tourism. Increased connectivity might be expected to increase both inbound and outbound tourism with the overall impact unclear

4.2 QUANTIFYING PRODUCTIVITY IMPACTS

4.2.1 There has been considerable work undertaken on the links between aviation or international connectivity and business productivity over the past decade or so. The argument is essentially that constraints on aviation growth generally and, more specifically in this study, constraints on the expansion of a hub airport, imply a broader loss of productivity to the UK economy than can be valued through changes in direct business travel costs.

4.2.2 There remain considerable uncertainties and previous academic studies find elasticities of productivity to improved international connectivity ranging from 0.007 to 0.13.

4.2.3 The 2007 study draws conclusions from cross-sectional statistical analysis of air connectivity and labour productivity. In

Table 4.1: Connectivity to productivity elasticities from other studies

Study	Relationship Found
Aviation Economic Benefits, 2007	A 10% rise in air connectivity, relative to GDP, will boost productivity and hence GDP, by 0.07%
Economic Contribution of the Aviation Industry in the UK, 2006	A 10% rise in air connectivity, relative to GDP, will boost productivity and hence GDP, by 0.6%
Airline Network Benefits, 2006	A 10% rise in air connectivity, relative to GDP, will increase investment by 0.6% and boost productivity by 0.9%, with a total increase in GDP of 1.2% (investment is assumed to translate into GDP at a ratio of 0.35)
The Economic Catalytic Effects of Air Transport in Europe, 2005	A 10% rise in air connectivity, relative to GDP, will increase investment by 1.6% and boost productivity by 1.3%, with a total increase in GDP of 1.9% (investment is assumed to translate into GDP at a ratio of 0.35)

SECTION 4: LONGER-TERM, WIDER IMPACT TO THE ECONOMY

undertaking that analysis it has to try and allow for all the other differences between countries which also affect labour productivity so that the impact of changes in connectivity can be identified. That is not at all easy.

4.2.4 The three earlier studies are all derived from models of the world economy. The data that they use is synthetic (i.e. modelled) rather than real, but, at least in theory, they are better able to isolate the impacts of changes in connectivity.

4.2.5 What is striking, however, is the scale of the difference between the results. The 2005 study suggests an elasticity of GDP to connectivity of 0.19 compared to 0.007 in the 2007 study. The latter is only about 4% of the former. One reason why the cross-sectional study may look low is that it applies the elasticity of what is inherently a local change (increasing capacity at an airport) to the national economy. The GDP impact is likely to be unevenly spread and our analysis highlights the different regional impacts.

4.2.6 On the other hand the elasticities set out in the earlier studies appear to lead to extraordinarily large returns from airport investment. Our view is that they are unreasonably high.

4.2.7 For our purposes we have adopted the most cautious of the valuations described above, the 0.007 elasticity from the 2007 IATA study. As that approach describes an elasticity between a change in international connectivity and national GDP we have made that calculation first.

4.2.8 That suggests that a third runway at Heathrow would add 7% to the total international connectivity of the UK. Applying the elasticity to that change produces a total increase in annual UK GDP of some £600m per annum.

4.2.9 However we have also taken account of the fact that some 20% of the additional runway capacity has been allocated in our analysis to new or expanded services to/from the UK regions and the relative impact on London and the South East is less than on the regions. That is because:

- London based trips already have access to all the London airports and are largely indifferent between them for point-to-point trips. The connectivity of London is therefore

only increased by the increase in flights as a proportion of all London flights

- Regional based trips generally need to change (few point-to-point destinations) and the more regional locations are excluded from Heathrow the more difficult that becomes
- An expanded hub airport would enable regional air services to be at least restored to previous range and frequencies and probably enhanced
- Hence the change in connectivity would be much greater for the regions

4.2.10 We therefore produced a separate analysis, showing how the overall increase in output would be spread across the UK regions. In doing that we prepared a domestic “connectivity index” within the UK, showing the change in connectivity to each region. The overall GDP growth was then allocated between the regions.

4.2.11 Table 4.2 below shows the impact on long run UK GDP and the share by region, expressed both on an annual and a PV basis over 60 years. There are some UK regions which have been excluded from our WEBS analysis given that they have good access to London by alternative transport modes and are too close for an air operation to be viable or realistic. For example, many areas in the East of England are accessible to and from London within a two hour train journey.

Table 4.2: Productivity impact on UK GDP

	GDP, £m a year (undiscounted)	GDP (£m, 2009 prices, PV over 60 years)
London & South East	225	7,500
North East	115	3,950
North West	45	1,500
Yorkshire & The Humber	25	800
South West	160	5,400
Scotland	20	600
UK Off-Shore	5	250
Total UK Impact	595	20,000

NB Values in this table are rounded.

4.3 EMPLOYMENT

4.3.1 In an appraisal of public sector investment in transport infrastructure it is unusual to value the direct and indirect jobs created. That is because all public sector expenditure generates employment and it is difficult to understand the counter-factual, that is, how many jobs would have been created if government had put those funds to some other use.

4.3.2 In this instance however it seems likely that the private sector would pay for the costs of additional capacity, particularly if that was targeted at Heathrow. BAA the likely developer is an international business and if it could not invest in London would invest wherever else in the world it felt maximised its returns. Hence it is not unreasonable to assume that this investment takes place or no investment takes place. Under that scenario the direct and indirect employment generated can be considered as net additional to the UK and hence a Wider Economic Benefit.

4.3.3 Investment in additional runway capacity is estimated by the DfT to produce an additional 10,000 jobs¹⁹ at the airport with other indirect jobs also likely. We have not valued those jobs but there must be a significant value there.

4.4 QUANTIFYING IMPERFECT COMPETITION BENEFITS

4.4.1 In an imperfectly-competitive market firms will normally produce lower output levels than economic theory would imply. Marginal costs of additional output will be lower than marginal revenues. Thus increasing output due to a reduction in transport costs will produce a higher value than the saving in transport costs.

4.4.2 DfT guidance on WEBS²⁰ reviews this process and recommends that the best proxy for this effect is to apply a factor of 10% onto the value of the business time savings and the reliability gains derived from the transport investment.

4.4.3 Doing that gives a value of approximately £30 million per annum.

4.5 OTHER WIDER BENEFITS

International business location

4.5.1 London is a “World City”, one of only three or four at present, although competition is growing. London’s speciality is Finance and

Business Services. It is the financial capital not just of the UK but of Europe where half of European investment banking is conducted in London and of the world with nearly one third of global foreign exchange trading taking place in London. Through that global position central London is one of the main generators of economic wealth for the UK.

4.5.2 London’s eminent position is not to be taken for granted. There are strong elements of inertia in the location of the main clusters (London, Paris, Tokyo, New York have remained as the four world cities for decades) but world cities do not last for ever and are constantly under threat from emerging cities.

4.5.3 The issue is how much better would international connectivity need to be from Paris or Frankfurt before those cities started to be realistic competitors for the role of European financial capital? There is no right answer to that question and international connectivity is only one factor within those location decisions, but there must come a point at which it is the key factor that tips the balance.

4.5.4 Theoretical research on agglomeration suggests that clusters have key critical points where as they grow they shift suddenly up a productivity level and as they decline they do the reverse²¹.

UK – multinational workforce

4.5.5 One of the UK’s key economic advantages is its highly flexible workforce and willingness to recruit skills from around the world. There are an estimated 3.8m overseas born workers in the UK of whom 2.6m are from outside the EU.²² If the UK wishes to retain its ability to recruit workers from around the world it needs to maintain good air access to the diverse range of locations where they come from. While modern telecommunications enables people to keep in touch with family and friends around the world they do not enable one to participate in family events in the same way that physical access does.

4.6 CONCLUSIONS

4.6.1 In this section we have prepared what we believe are appropriate values for the wider economic benefits that would arise from a third runway at Heathrow. These are entirely

¹⁹ ‘Adding capacity at Heathrow Airport: Impact Assessment, DfT, 2009

²⁰ Transport, Wider Economic Benefits and Imp[acts] on GDP, DfT 2006

²¹ GLA Economics WP17: Why Distance doesn’t die: Agglomeration and its benefits

²² Quarterly Migrant Worker Estimates, Table 2, ONS, February 2009

SECTION 4: LONGER-TERM, WIDER IMPACT TO THE ECONOMY

additional to the value of the user benefits produced in Section 3.

4.6.2 The value of the quantified wider benefits to UK plc of a third runway is £595m per year, and £20bn as a PV over 60 years.

4.6.3 In interpreting these results it is worth bearing in mind that:

- There is uncertainty over the productivity elasticities; we have adopted a cautious value at the bottom of the available published evidence
- The impacts vary across the UK and tend to be higher to the UK regions than to London and

the SE. The regions gain 60% of the total WEBs

- The employment impacts, based on DfT figures suggest that by 2030 there could be an additional 10,000 direct jobs
- There are other important issues which have not been valued, including the UK's failure to attract air links to the rapidly expanding BRIC countries and the importance of international labour to the UK economy
- Without the third runway things will get worse. Heathrow will continue its relative decline to the detriment of the UK economy

“Air connectivity to the UK is important to investors, but so is connectivity across Europe. Often these investors are looking for a European HQ and they know they’ll move here and spend most of their time going back and forth to European locations and only going ‘home’ occasionally. So I think it’s really more about European connectivity that is important for attracting Asian investors to the UK.”

UK advisor to Asian firms looking to invest in the UK

5.1 SUMMARY OF ECONOMIC IMPACTS

5.1.1 This study has looked only at the economic impacts of hub airport expansion. It has deliberately not looked at many of the more controversial issues of environmental impacts and surface access. Within those particular terms of reference, the study concludes that:

- There are very substantial economic gains to UK plc that would be made from hub airport expansion. Our work suggests that those benefits would include £8.6bn-£12.8bn (PV) in direct productivity and £20bn (PV) in wider economic benefits, which yields a total PV of £28.6bn-£32.8bn in benefits arising from hub airport expansion
- The wider economic values are derived on the basis of the lowest findings of all the recent work on Wider Economic Benefits of airports - there could be significant upsides
- An expanded hub airport would generate significant gains for the regions, especially those currently excluded from Heathrow due to a lack of capacity. Some 60% of the benefits are predicted to be outside London and the South East
- The wider benefits, valued at £20bn PV over 60 years, are higher than those found for major rail schemes such as High Speed 1 (£3.8bn PV), and even greater than the £10bn PV claimed for high speed rail to the North²³, and Crossrail's £15bn PV
- A key difference between investment in airport expansion and in high speed rail is that the cost of airport expansion and the risks associated with future revenue streams would be borne by the private sector, whereas rail infrastructure investments would be funded by the taxpayer

5.2 ARE THESE IMPACTS UNIQUE TO HEATHROW?

5.2.1 From a UK plc perspective it makes little difference where a UK hub airport should be located (as long as it has good connectivity to London and the regions) and can be delivered in a timely and cost effective manner.

5.2.2 We have assessed the economic impacts of expanding Heathrow because this appears to be a quicker and less expensive option than other possibilities. There are other alternatives for having an expanded hub airport:

- Creating a new, three-runway (or more) airport east of London, in the Thames Estuary (or elsewhere)

- Expanding Stansted or Gatwick from one runway to three
- Using high speed rail to link the London airports (allowing them to function collectively as a hub)
- Linking the north to London airports with high speed rail
- Expanding UK regional airports

5.2.3 In theory, creating a new hub airport would deliver the same benefit of capacity expansion as described for Heathrow, though it would take significantly longer to deliver and cost many times more to build both the airport and the entire connecting infrastructure. The same is true for making Stansted or Gatwick the new key hub – the benefits would be the same, though the cost more and the time longer, given that both of these airports have further to go (from one runway to three) and current connectivity infrastructure would need upgrading.

5.2.4 So the benefits calculated are not unique to Heathrow, but it does appear that Heathrow is in a unique position to deliver them in a timely fashion, which is an economic consideration. For every year that hub capacity expansion fails to take place, the trade-off is an estimated £900m-£1.1bn (direct productivity and wider benefits). If expanding Stansted or Gatwick to be the lead hub were to take ten years longer than expanding Heathrow, the cost of that delay is estimated at £5.3bn-£6.4bn (PV) to UK plc. If constructing a new airport takes 20 years longer, the trade-off in lost benefit to UK plc is £8.9bn-£10.9bn (PV).

5.2.5 Considerations around high speed rail are relevant as well, as high speed rail would provide a good complement to any airport capacity expansion plan. But on its own, use of high speed rail would do little to alleviate the current capacity constraints at Heathrow, as eliminating current UK flights (except Belfast) would free up around 9.7% of slots if all air passengers transferred to rail. High speed rail would provide a complementary benefit for the UK regions, but on its own does little to increase capacity.

5.2.6 Similarly, a high speed rail link between London airports would increase the ability to hub and remove some duplication of services, freeing up some capacity. But linking, for example Heathrow and Gatwick, which are both effectively at capacity, would deliver relatively little in the way of additional capacity from the efficiency gains, and a new runway would still be needed.

²³ Jarvis, John (The Northern Way) "There's no quick fix – but higher train speeds would certainly help." http://www.publicservice.co.uk/feature_story.asp?id=11894, May 19, 2009.



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