

THE FUTURE OF HUBBING IN LONDON

1 Introduction : The Prerequisites for a Successful Hub

Before assessing the future of hubbing in Europe it is worth considering what the prerequisites for a successful major hub airport are.

The term ‘hub’ is often used rather loosely in aviation parlance to represent simply any large airport or airline operating base. In the post-deregulation USA it has come to mean something rather more specific: an airport whose facilities are planned to handle large volumes of connecting passengers in a short space of time. At large hubs this means that the largest base airline, in a few cases there may be two, organises its flights in ‘banks’ of arrivals followed within an hour or so by a ‘bank’ of departures. The aim is to minimise the connect time between flights, while offering the maximum number of possible connections.

An airport should enjoy several key advantages to operate successfully as a major international hub:

- (a) A central geographical location is required to enable the linking of the greatest number and range of markets, with minimal time loss through circuitous flight routings for transfer passengers . Ideally the location should facilitate both east to west and north to south connections.
- (b) Sufficient runway capacity and suitable terminal transfer facilities to maximise the opportunities for hubbing and, in particular, to facilitate connecting passenger traffic. While two parallel runways have been sufficient for the development of Europe’s largest hubs up to now, US experience suggests clearly that the major hubs of the future will require four or more parallel runways.
- (c) Strong local demand is beneficial to help underpin a wide range of services and frequencies. Because there is generally less competition for non-stop flights, this helps support higher yields. However, unlike geographical location and airport facilities, strong local demand is not a prerequisite. Airlines such as Singapore and Emirates have developed effective hubs without an initial strong local traffic base, though this has now been built up.
- (d) Finally, an airport requires an airline which sets out to develop and maintain a hub strategy based on that airport. This airline must, in turn, have a sufficiently large share of the available slots to be able to mount several banks of arrivals and departures.

The future of hubbing at the London airport(s) will be determined by the degree to which one or more of these airports satisfies the above requirements.

For historical reasons, London-Heathrow has developed as a major international hub airport with British Airways as the hub operator. However, London does not appear fully to meet the basic requirements.

- (i) First, London is ideally located as a North Atlantic gateway to Europe and also as a hub between Europe and Latin America. However, it is too far west to operate as an optimal hub to Asia and the Far East, or as an intra-European

hub. Zurich, Frankfurt or Paris are all more centrally located and therefore more suitable for short to short-haul connections .

London is perhaps more akin to US coastal cities such as New York or Los Angeles than the major regional hubs such as Chicago or Atlanta.

In the longer term London's locational disadvantage will be a handicap to overcome. While ideal for some short to long-haul and long to long-haul hubbing it is poorly located for intra-European hubbing.

- (ii) Second, in terms of facilities Heathrow suffers from two shortcomings. It has only two parallel runways and BA's operations are split between two terminals which are distant from each other. This necessitates much longer minimum connect times than at other European hubs for short to long-haul connections. It also inconveniences passengers. Terminal 5 may solve BA's difficulties with transfer passengers but will not resolve the slot shortage.
- (iii) On the other hand, London's major advantage is that, because it is cut off by sea from mainland Europe and because of its historical and past colonial links, it generates by far the greatest demand for air travel of any city region in Europe. This pre-eminence of London as a traffic generator is unlikely to disappear. It provides a very strong base for any airline wishing to operate a London-based hub.
- (iv) Finally, British Airways has been less assiduous in developing a hubbing strategy at Heathrow than other European airlines at their own hubs. While it has marketed and sold connecting flights through both Heathrow and Gatwick it has not organised such flights in banks or waves of arrivals and departures as KLM or Air France have done. As a result connections between incoming and outgoing flights within a two-hour connect time are no better than random. BA's strategy of not 'banking' flights may well be due to the fact that at Heathrow it controls a relatively small share of the available slots (38% in 2001) and the segregated mode operation of the runways means that it cannot even interchange arrival and departure slots to obtain a concentration of one type at a particular time. This limits its ability to schedule banks of flights. If one takes the main departure peak in the morning (around 0930), Air France schedules 52 departures in 55 min at CDG, KLM 63 departures in 75 min at AMS and Lufthansa 68 departures in 105 min at FRA. In contrast BA schedules about 18 departures in every hour at Heathrow with no obvious peaks. If BA were to operate from an airport with substantially more runway capacity than Heathrow has currently, it would be able to schedule its flights in waves, if it so decided.

Some of the above shortcomings of Heathrow would need to be tackled if London is to remain one of Europe's largest aviation hubs - a pre-eminence that is gradually being eroded by both Paris CDG and Frankfurt. The volume of transfer passengers handled at the major European hubs in 2000 was Paris CDG 27.9m (58% of total traffic), Frankfurt 24.5 m (50%), London Heathrow 21.9m (34%), Amsterdam 16.1m (41%). (Source: SSSB)

2 The Future of Hubbing in Europe

2.1 Trends in Europe

- (i) **Medium-sized European flag carriers and their associated hubs are declining** in importance. This process started in the late 1990s and has been reinforced by the current cyclical downturn in demand for air travel, and of course aggravated by September 11th 2001. Continued liberalisation, the creation of alliances and the greater use of smaller long-haul aircraft have reinforced the market pull of larger hubs. At the same time most medium-sized European flag carriers that have tried to maintain a short to long-haul hub strategy have found their networks over-extended and their long-haul routes generally too thin to be competitive. Substantial losses have been incurred. Sabena collapsed during the summer of 2001 primarily because of its efforts to develop and support an extensive global hub at Brussels. Carriers such as Olympic, Air Portugal, Austrian, Swiss, SN Brussels are too small to be able to continue to sustain their aspirations to be global players. Second level European hubs, such as Brussels, Zurich, Lisbon, Athens, Vienna, will tend to lose a significant part of their long-haul services and will, therefore, decline as hubs. This will reinforce the importance of the major hubs – provided they have adequate runway/terminal capacity for future expansion.
- (ii) The **emergence of low-cost carriers** as a major force in intra-European services since 1995 is undermining the economics of hubbing. It is impacting on European hubs in two ways. First, where low-cost services parallel routes to hubs (e.g. Ryanair's Stansted-Lubeck services parallel BA's Heathrow-Hamburg flights) they have forced down the fares and yields of the conventional scheduled carriers. This undermines the viability of many short-haul feeder services to hubs because they have been dependent on high-yield local traffic to compensate for the very low yields from online connecting passengers. Second, when they fly on many thinner routes to hubs, low-cost carriers have not only generated new traffic but they have also diverted traffic from conventional airlines. Traffic has also been diverted by new low-cost point-to-point services linking new points, thereby bypassing the hubs (e.g. Ryanair's services from Brussels-Charleroi to Pisa and Perpignan offer passengers the opportunity to by-pass the Milan or Paris hubs respectively). On several routes to major hubs, the twin impact of lower yields and loss of market has forced the conventional carriers either to pull off the route altogether or to franchise it to a regional carrier with lower unit costs (e.g. both Alitalia and BA have pulled off London-Turin and British European now operates Heathrow-Toulouse for Air France. Alitalia pulled out of Heathrow-Bologna although BA retains a service from Gatwick.) It is the traditional airline operating on a route outside its hub that is most vulnerable to low-cost competition. Air France has abandoned its own service on Heathrow-Nice and code-shares on Bmi. On a few routes however, the low-costs have tried and given up: e.g. London to Lisbon, Helsinki or Vienna.

Low-cost, no-frills services are well developed out of the UK and especially the London area, but as yet poorly developed in Europe. Major hubs such as Frankfurt, Paris CDG or Amsterdam are only just beginning to face serious inroads from new low-cost services radiating from their own catchment areas. In the next five years the fastest growing travel markets in Europe will be on low-

cost routes within mainland Europe. These developments will impact adversely on existing feeder routes to major European hubs. However, it may be more difficult for low-cost airlines to attack hubs which are more dominated by a single carrier than London is.

- (iii) Major European carriers are having to **rethink their hub strategies**. BA was the first to do this way back early in 2000. For most of the 1990s BA had been very profitable overall but had failed to make any real profits on its European services, even though they generated 35-40% of BA's total turnover. From 1998 onwards European routes began to suffer large losses. As BA's overall profitability collapsed, three market segments were found to be the main loss-makers – short to long-haul transfers in Economy, short-haul point-to-point Economy within Europe and short to short transfers. BA then began to reduce its exposure to these segments by cutting some short-haul routes and switching to smaller aircraft on long-haul routes. On smaller aircraft it would be less dependent on having to fill large numbers of very low-yield economy seats. Effectively BA began to down-play its role as a hub operator serving all markets and refocused on higher-yield, long-haul services. This strategy was reinforced by upgrading the long-haul Business product with the introduction of flat beds. Lufthansa and Air France meanwhile are continuing to move in the opposite direction, expanding their long-haul routes and reinforcing their hub feeders through franchising or buying regional airlines.
- (iv) The other consequence which appears to be emerging from the trends discussed above is that the major European network carriers will **increasingly focus on long-haul services** and those **short-haul European routes where they can generate sufficient high-yield business** or other traffic. On shorter routes where this is not the case, they will either pull out or hand them over to franchised regional carriers that can operate at lower unit costs and will generally fly smaller aircraft.

2.2 Trends in the United States

Effective hubbing has been developed over a longer period in the United States because airline deregulation was implemented 15 years earlier than Europe. This, together with the fact that airline consolidation has progressed much further means that US experience provides an indication of how hubs might develop in Europe.

Though over 60 new US carriers emerged after deregulation in 1978, nearly all have collapsed or been consolidated into seven major carriers, which together generate 81% of US airline passenger traffic (the seven European majors only carry 47% of European traffic). This has come about through acquisitions and mergers. One result is that **each of the conventional US majors**, unlike their European counterparts, **operates several major hubs** – United has five, American and Delta have four each, while Continental, Northwest and USAir each have three. They all operate multi-hub networks. In most cases these are also optimised to serve different geographical flows. For example, Delta's hubs at Atlanta, Cincinnati, Dallas/Fort Worth and Salt Lake City are well spread to capture all the major markets.

Some airports are however more important as international gateways than as domestic hubs: New York JFK, Washington Dulles and Boston for the North Atlantic, Miami for Latin America, San Francisco and Los Angeles for the Pacific. Conversely, some

of the largest domestic hubs such as Denver and St Louis have very little international service. London, because of its geographical location, is naturally more analogous to the former group.

Table 1 details the ten largest US hubs in terms of numbers of connecting passengers handled. These are all **mid-continent hubs, which tend to handle a higher proportion of transfer traffic (50-75%) than those in the coastal cities.**

Comparable figures are 22% for New York Newark; 14% for New York JFK; 25% for Los Angeles; 34% for Miami. This is because the mid-continent hubs have lower origin/destination demand but can serve a wider range of geographical flows within the region. The coastal cities have to concentrate mainly on long to short haul transfers. The European parallel is that a location such as Frankfurt is likely to handle more connecting traffic than London but London should be able to continue to support the greatest volume of North Atlantic services.

Table 1: Ten largest US hubs in terms of volume of connecting passengers, 2000

<i>Hub and major airline(s)</i>	<i>Connecting pax (million)</i>	<i>Total pax (million)</i>	<i>% connecting</i>	<i>ATMs (thousand)</i>
Atlanta (DL)	51	80	63	686
Chicago O'Hare (UA, AA)	38	72	53	634
Dallas/Fort Worth (AA, DL)	37	61	62	822
Houston G Bush (CO)	21	35	60	451
Denver (UA)	20	39	53	529
Minneapolis/St Paul (NW)	20	37	55	457
St Louis (AA)	20	31	65	481
Detroit Wayne Co (NW)	19	36	54	488
Charlotte (US)	17	23	74	404
Cincinnati (DL)	17	23	75	426

N.B. These are not the largest airports but those with largest volume of connecting pax.

Source: ACI North America

But no two hubs of the same airline are in close proximity. The closest two are USAir's Philadelphia and Pittsburgh hubs, though one of these is likely to be downgraded as USAir gets more closely linked to United.

Where majors compete for the same local traffic they do so by mounting **hubs at the same airport rather than at neighbouring airports** serving the same catchment area. Thus United and American both have hubs at Chicago O'Hare and Delta and American do the same at Dallas-Forth Worth. One exception was the USAir hub at Baltimore competing for Washington traffic with the United hub at Washington-Dulles. However, USAir also found itself under attack from expansion by Southwest who chose Baltimore as their Washington area airport and with a more easily defended hub at Philadelphia nearby, the USAir Baltimore hub has been cut back in recent years.

Airline consolidation in the United States has resulted in **greater concentration on a smaller number of larger hubs**, but also the decline of several smaller hubs which had emerged in the 1980s. These include Raleigh-Durham, Dayton and Nashville. As airlines rationalise or merge, it is always more efficient to close a duplicating hub and concentrate resources on the stronger hub. In Europe due to nationality rules, this phase of consolidation has yet to take place.

As in Europe the economic and traffic downturn and mounting losses in the last two years, even before September 11th 2001, has forced some **US majors to begin to rethink their hubbing strategies**. The rethink is necessitated by the fact that market conditions and low-cost carriers are beginning to undermine the economics of hubbing. This was based on generating sufficiently high yields, especially from business passengers and on local point-to-point traffic, to compensate both for the lower yields from transfer passengers and the higher costs of hubbing. The need to man and service several intensive traffic peaks each day and to night stop aircraft and crews away from their base made hubbing more costly than anticipated. Delays to one flight can snowball through the whole system, pushing up costs. Costs escalated further as a result of substantial wage increases in the last three years. To cover these higher costs, flexible full-price tickets, used primarily by Business passengers, rose sharply in the late 1990s. The gap between Business fares and Economy fares, and especially those offered by low-cost carriers, became unsustainable. As a result, Business fares have been coming down in the last 12 months. This in turn undermines the economics of hubbing. In response to this changing market environment American Airlines is beginning to unwind its hub and spoke system. It is moving away from scheduling banks of arriving and departing flights. By reducing these peaks, it is cutting the number of staff required and limiting possible congestion and delays, thereby reducing costs. But many passengers will have to wait longer for connections. Other majors may follow suit and also unwind their hubs. This is less likely, however, because American has three hubs serving similar east-west flows (Chicago, St. Louis and Dallas/Fort Worth) and hence can use this duplication to compensate for fewer designed connections at each. However, greater efficiencies and cost savings could be achieved by simply closing down one hub altogether. Hubbing is unlikely to cease. The marketing advantages will always be present. For the majors the strength of their networks is their main differentiating feature over Southwest and other low-cost operators. It is certain that the US majors will continue to operate hub-based networks but hub operations may be less intensive and some weaker hubs may disappear.

2.3 What will be the impact of further deregulation (i.e. on airline ownership and nationality) and airline consolidation on the pattern of European hubs?

The most serious barrier preventing airline consolidation is the nationality rule. But pressures for change are mounting. Within the next two months the European Court of Justice is expected to publish its decision on the legality of “open skies” bilateral agreements signed by some EU states with the USA. It is probable that the Court will decide that it is contrary to EU laws for an EU state to sign a bilateral under which only airlines owned by its own nationals can be designated. Designation should be open to airlines owned by nationals from any EU state. Such a decision would have far-reaching consequences. At ICAO a new model bilateral will be proposed at the 2004 Air Transport Conference. This will give states the option of replacing national

ownership as the basis for airline designation by an alternative criterion namely that designated airlines should have their “principle place of business” in the designating state. IATA too has moved in the same direction and espoused the idea of doing away with nationality as a way of enforcing economic regulation.

Change is inevitable. But it will be slow and piece-meal. The accession of up to 10 new states to the European Common Aviation Area will create a vast market within which there will be no ownership constraints for airlines operating purely within this Area. The next step is likely to be some relaxation of ownership for EU airlines flying to North America.

Within 10 years or so the nationality rule will have been removed, or effectively relaxed, in most markets. It is unlikely that any major airline will take advantage of the liberalised environment to launch a brand-new operation in another European country however. Instead, the result will instead be a growing spate of cross-border acquisitions and mergers initially between European airlines and later involving non-European airlines as well. In the process, the existing global alliances will go through a period of great instability since acquisitions may cut across existing alliance memberships. Following that the global alliances, perhaps with some changes in membership, will settle down and become more integrated at the operational level. They will move from the current alliance phase which has focused on revenue generation, to the next phase of cost reduction through sharing of certain activities and functions to the final phase where alliance partners will operate their air services increasingly as joint ventures under a single brand.

In brief, airline consolidation will be driven by two forces: first, cross-border mergers and acquisitions as the nationality rule is relaxed and, second, the strengthening of alliances as they become more like joint ventures.

In Europe these processes will create a smaller number of large European global carriers, each of which will be linked into strengthened global alliances. One or two may be in the same alliance. The trends, discussed earlier, both in Europe and more especially in the United States suggest that this growing consolidation will have major implications for hubbing in Europe.

- i Each of the European mega carriers, together with its non-European partners, will focus its development on a small number of European mega hubs, which ideally should be geographically dispersed across Europe. Such hubs will focus primarily on short-to-long-haul connections and possibly more limited short-to-short connections.
- ii The existing multi-hub systems of some alliances can not be sustained either because the hubs are too close to each other and/or because the base airline is too small and is likely to be swallowed up by a larger carrier. The best example of a non-sustainable hub system is that of STAR group with hubs in Frankfurt, Copenhagen, Munich, Vienna and Warsaw. Only one or two of these can survive as enlarged hubs.
- iii In seeking to develop their second or even third mega hub Europe’s enlarged majors will be looking for a location that is geographically well positioned, not too close to their existing hub(s) and serving a catchment area generating a high volume of local origin and destination traffic. The London area meets these criteria. It will be particularly attractive to

a European major in alliance with a US mega-carrier and wishing to establish a second trans-Atlantic gateway hub. Whether a London area hub is established will depend on whether there is an airport providing the required runway and terminal capacity.

2.4 What are the risks associated with developing a 30-year airports policy around the hubbing concept?

Perhaps the greatest risk is that **British Airways will not survive the current crisis** and economic downturn or that in order to survive it dramatically cuts back its largely unprofitable European network. BA's current financial position is weak since it has large debts to service and neither its traffic levels nor its average passenger yields have recovered to pre-2001 levels. War in the Middle East, the failure of long-haul business traffic to recover and further erosion of European yields as a result of the expansion of low-cost carriers are major threats hanging over BA. The combination of any two, if severe enough, could lead to the collapse of BA or its acquisition by a more successful European airline. In the latter case, the new owner is likely to rationalise BA's services so as to complement those from its own European hub. This is likely to result in a significant reduction in BA's services, especially European services. But its long-haul hubbing operations would continue focusing on the trans-Atlantic.

A more likely scenario is that, to avert collapse, BA's management begins drastic surgery of the network. This would involve pruning most of the European network and those very thin long-haul routes that are most dependent on short-haul feed. BA would become primarily a long-haul operator – a larger version of Virgin Atlantic. The pruned services would be replaced by other carriers, but they would not necessarily feed a BA hub.

The second risk is that the continued rapid development and **expansion of European low-cost services may undermine the hubbing model**. Hubbing services are potentially under threat from two directions. First, rapid growth of low-cost routes may divert traffic and services away from the hubs to secondary airports serving the same catchment area (more or less). Second, the launch of more and more direct point-to-point services within Europe/North Africa joining both smaller regional airports to each other and regional airports to secondary airports close to a major hub will enable passengers to by-pass hubs. The risk is that over the next 20-30 years these two trends may result in an actual decline of short-haul services to the major hubs such as Heathrow.

It is difficult to see this happening for two reasons. First, the experience of easyJet operations from Gatwick and Orly shows that low-cost carriers can charge a premium when operating from airports with better facilities and good surface access. Any cut-back of services by conventional airlines at their own hubs are likely to be filled by low-cost airlines. This is provided that the airport operator does not create obstacles to their doing so and that fast aircraft turn-rounds are still possible. But such low-cost services will not generate transfer traffic. Second, if the hub airline continues to operate long-haul services it will need as much feed from shorter sector traffic as possible to maintain higher frequencies and, ideally, support the use of larger and more economic aircraft on its long-haul routes. Where hub airlines are themselves withdrawing from short-haul routes because they are no longer viable, they will try to substitute services by lower-cost regional operators, mainly operating as franchisees.

Many of the larger European regionals have in recent years been bought by the majors, precisely in order to ensure feeder services to their hubs at unit costs that are lower than their own (e.g. Air France's purchase of Regional Airlines, or Lufthansa's part purchase of Eurowings).

Thus the risk that intra-European low-cost expansion and hub by-pass services will undermine the major hubs can be discounted. However, the way major hubs operate may change with greater emphasis being placed on long-haul services.

One aspect of that change in hub operations may be that **hubs develop some geographical specialisation** based on their locational advantages. This will come about as the European majors and their alliance partners each develop 2-3 mega hubs in Europe. Thus Heathrow or a London hub may become a trans-Atlantic gateway to Europe with an expansion of routes and frequencies to North America but with more limited expansion of services to the Far East or South America. A central or North European hub may be better placed for the latter. In the case of the oneWorld alliance, one could envisage that Madrid might become the alliance's major hub for services to Latin America and Africa, while London focused its trans-Atlantic services.

Clearly geographical specialisation of major hubs would affect the range of services being operated to each hub airport and the average size of aircraft.

Finally, hubs might also be at risk if **more new point-to-point long-haul services are introduced to bypass the major hubs**. This trend has been evident over the last decade as long-haul aircraft substantially smaller than the Boeing 747 have become increasingly available. But this does not appear to have stemmed the growth of long-haul traffic at the hubs. In fact during the present crisis it is many of the thinner hub by-pass routes that have been withdrawn. For example, American has dropped San Jose to Paris CDG, SAS has dropped Oslo to New York Newark and Lauda has dropped Vienna-Miami. Delta have redeployed a Boston-Gatwick daily frequency to make a fourth daily Atlanta-Gatwick. Also, despite an overall decline in traffic levels, passenger numbers on hub-to-hub trunk routes have actually risen, with Air France adding a Paris CDG-Atlanta and Delta a new Cincinnati-Rome. A recent study found that although a net 47 hub-to-spoke or point-to-point daily frequencies had been deleted from the North Atlantic in summer 2002, hub-to-hub frequencies were actually up by a net figure of 2 per day!

3 Can Heathrow survive as a major global hub?

3.1 Can a major international hub remain effective and competitive in the coming decade if operating on only two runways?

Two runway airports are not viable in the longer term as major hubs because of lack of sufficient runway capacity at peak periods to support the scheduling of banks by the hub airline. At Heathrow this is currently exacerbated by the two runways being operated in segregated mode, preventing any concentration of arrivals or departures.

The US major hubs all have three or more runways including at least one set of parallel runways or runways that can be used simultaneously (Table 2):

Table 2: Runway configuration of 10 largest US hubs (as defined in Table 1)

	Runways	ATM (000)* 2001
Atlanta	4 (2 pairs close parallel)	855
Chicago O'Hare	6 (3 parallel pairs)	890
Dallas/Forth Worth	7 (1 pair close parallel)	740
Houston G Bush	4 (1 pair close parallel)	427
Denver	5	530
Minneapolis/St Paul	3	440
St Louis	5 (1 pair close parallel)	415
Detroit Wayne Co	5 (1 pair close parallel)	464
Charlotte	3	399
Cincinnati	3	446

**Source: 'Airline Business' June 2002*

N.B. Source differs from Table 1

The largest European hubs are also adding runways or have the capacity to do so. Paris CDG has added two additional runways to its existing two, all being parallel. Amsterdam has four runways with two available for arrivals or departures at any one time. It is constructing a fifth runway but this is more to reduce noise impact than to increase throughput. Frankfurt has three runways although they are not in an ideal layout. It is planning to add a fourth runway to maintain its position as a leading European hub.

Heathrow, with only two runways, cannot provide sufficient capacity to remain viable as a global hub, especially since BA controls a relatively small proportion of the available slots. In 2001 its share of used slots was only 37.9% compared to KLM's 53.9% at Amsterdam, Lufthansa's 57.1% at Frankfurt and Air France's 54.9% at Paris CDG. At airports other than Heathrow these shares rise to 65% or more when the slots of subsidiary airlines, franchisees or partners are added. For instance, KLM and its various associates operate around 70% of the used slots at Amsterdam. Two runway airports can only be major league hubs if the hub airline grouping controls around two-thirds of the slots. Thus Munich could be a more effective hub than Heathrow because Lufthansa and its partners operate close to 60% of the used slots and there are still many unused slots. At Heathrow even with its alliance partners, BA only has around 45% of the slots. This severely restricts BA's ability to expand as well as its ability to schedule in banks to facilitate connections. Introducing mixed mode operations on Heathrow's two runways would improve the scheduling options for BA and provide a small amount of extra capacity, but could only be a short-term palliative.

BA at Heathrow lags well behind its main competitors in terms of the number of well-timed connections it is able to offer (Table 3). This is because Heathrow suffers from:

- (a) a shortage of slots, which reduces the possible number of short-haul frequencies compared to the alternative hubs;

- (b) the need for many passengers to make an inter-terminal transfer which increases the minimum connect time (MCT) required;
- (c) uncoordinated scheduling by BA which greatly reduces the number of connections available within 1-2 hours compared to the rival hubs with their wave systems.

This results in little more than half the number of feeder services being available per flight at Heathrow (16) compared to Amsterdam, Paris CDG and Frankfurt (all 27-30). A further study by the University of Westminster analysed end to end journey times available via the alternative hubs in a range of Europe-Intercontinental markets without direct service (e.g. Manchester-Tokyo, Oslo-Los Angeles). This suggested that BA's Heathrow hub had slipped from second best only to Frankfurt in 1995 to fifth place in 1998 as other hubs rapidly improved their network coverage and scheduling, despite BA still operating more long-haul frequencies than any of the alternatives.

Table 3: Comparison of daily operations by hub airlines at major European airports (Thursday 27 June 2002)

	Short-haul departures per day by hub airline	Long-haul departures per day	Pairs of connecting flights in target time*	Onward connections per flight*
Paris CDG (AF)	374	78	13,549	30
Frankfurt (LH)	353	70	12,222	29
Amsterdam (KL)	276	55	8,919	27
London Heathrow (BA)	237	80	5,260	16

**satisfying the MCT and maximum 90 minutes short-short haul and 120 minutes otherwise*

Source: University of Westminster research

If Heathrow continues as a two-runway airport it is likely that there will be some further rationalisation of short-haul services, particularly by foreign airlines. For example, KLM's Eindhoven and Rotterdam services using Turbo-prop aircraft could be moved to other airports and these slots passed to partner carriers such as Northwest (once they are allowed to access Heathrow) or 'sold', as happened to KLM UK's Guernsey service. BA could rationalise operations with its alliance partners on many of the European routes, freeing up slots for long-haul services. For many years BA has code-shared on Aer Lingus since abandoning its own Dublin flights and a deal with SN Brussels airlines where only BA operates but acquires SN's slots will shortly take effect. Further possibilities include deals with Swiss, Iberia and Finnair. It is

likely therefore that a two runway Heathrow will have a greater emphasis on long-haul operations which doesn't create a balanced hub. Many European routes will see a reduction from three operating airlines to two or two to one with a greater emphasis on code-sharing which may in turn increase aircraft size.

In brief, a two-runway airport will be progressively by-passed as a hub by airports with three, four or more runways. An airport such as Heathrow, where the hub airline has less than 50% of the slots will be particularly disadvantaged.

3.2 How would operations at Heathrow change in short-, medium- and long-term if a third runway were constructed there?

Much depends on how much additional runway capacity a third runway would add. Assuming that it is a 2000m runway, adding an additional 38-40% to the existing ATMs then a number of developments are possible. To optimise use of the runways some 'recycling' of slots is necessary with smaller aircraft moving to the new runway, freeing up slots for larger aircraft on the existing runways. However some short-haul European airlines may be unhappy with this, since slots on the new runway will be less valuable as they can never be used for larger/long-haul aircraft. They may switch to larger aircraft to keep access to slots on the two long runways.

- (i) BA may move more flights from Gatwick to Heathrow, especially long-haul services that require a better European feed than can be provided at Gatwick. It is also likely to increase frequencies on its more successful long-haul routes and may do this in part by switching out of 747s to smaller aircraft. BA may also move more flights from Gatwick than is strictly necessary, as a measure to ensure it has reserved sufficient slots for future use. This could involve reinstatement of some routes at Heathrow to secondary European points (e.g. Venice, Gothenburg, Inverness) as the new runway can only handle short-haul services and the marginal benefit of yet further additional frequencies to trunk European cities starts to diminish.
- (ii) Availability of new Heathrow slots would also provide an opportunity for bmi to further entrench itself at Heathrow by accessing some of those slots for new services or additional frequencies on its existing routes. In the latter case it would strengthen its competitive position vis-à-vis BA on those European routes where they compete head-to-head and which have a significant business component.

If, in the meantime, bmi has acquired rights to the USA from Heathrow, then it is likely that it will also expand its trans-Atlantic operations .

- (iii) Much clearly depends on what happens in the meantime to the UK-US bilateral. If, by the time the third runway is complete, Heathrow has been opened up to US carriers currently restricted to Gatwick (along with BA routes similarly constrained), then many of Gatwick's US services will be transferred. Entirely new services will also be launched from Heathrow to the US (e.g. Salt Lake City or Memphis, as well as additional carriers on routes such as New York, Boston and Los Angeles). Other non-US airlines serving Gatwick would also transfer to Heathrow. As a result of these changes and the BA transfers

mentioned earlier, a third runway at Heathrow would more or less destroy Gatwick as a long-haul airport. Only a few routes would remain (e.g. a New York service and some quasi-charter leisure destinations).

- (iv) Low-cost airlines such as easyJet would certainly expand rapidly at Gatwick, but may also launch new routes from Heathrow, as they would obtain some priority for slots as new entrants. However, these produce less passenger throughput per aircraft movement than long-haul services.
- (v) In the longer term it is likely that the moves by competing airlines to boost market share by increasing frequencies from Heathrow will neutralise each other. When this happens airlines will seek to rationalise their operations by switching to larger, more cost efficient aircraft. This is particularly likely where alliances enable duplicated frequencies to be consolidated (e.g. BA-AA to New York). If a third runway enables BA to introduce a wave structure, some feeder routes that are not of great value for their local traffic could be reduced in frequency to match the number of waves. For example, at Frankfurt, Lufthansa operates few routes at more than four flights per day other than London and the main German domestic points. Instead they use their spare slots to serve a much wider range of European destinations than is available from Heathrow.

3.3 How would the level of hubbing at Heathrow change if further runways were constructed at either Stansted or Cliffe? (rather than at Heathrow)

In the short term, no airline is likely to be bold enough to make the move to establish a large-scale long-haul operation at Stansted or Cliffe. This would be a very risky strategy, given that Heathrow long-haul services make an almost certain profit. Long-haul services to date from Stansted have a very poor track record with American, Continental and El Al all having tried and withdrawn.

Thus there is likely to be little immediate change in the level of hubbing at Heathrow, particularly if mixed mode runway operations remain off the agenda. As traffic levels grow over time BA would be forced increasingly to focus more on long-long haul rather than long-short haul markets, with short-haul services being displaced. This would change the nature of its operations and condemn BA to being a second tier mega carrier unless it was able to develop a second hub elsewhere in Europe. Given its experience at Gatwick, it is likely that BA would re-enter merger negotiations with KLM or Swiss rather than try to create a second London hub at Stansted or Cliffe. Heathrow is likely to become progressively marginalised as a hub without any additional runway capacity, as it will become steadily less competitive against the major foreign hubs as they continue to expand.

4 Could a second hub be developed in the South East?

4.1 Could the level of forecast demand in the South East support a second hub and what is the likelihood of its being a success?

Traffic levels in the London area, taking the four larger London airports together, are already well above the traffic levels of Chicago or Dallas Ft Worth. In theory they could already support a second major hub operation, even if one excludes charter and low-cost airlines' traffic. Whether the South East will attract a second hub operator depends very much on the nature of the airport expansion that is undertaken.

Demand could support a second hub but its chances of success would be greater if located at the same airport as any existing hub. However, a number of large US airports which previously enjoyed two or more hubbing airlines have reduced to one (Denver, Atlanta, Minneapolis) leaving only Chicago O'Hare and Dallas/Fort Worth with rival hubs.

An analysis of air transport movements at the latter two airports (Table 4) shows that for two hub operations to be effective in the USA at the same airport the two carriers need to have over 600,000 slots between them.

Table 4: Distribution of flights at airports with two hub operators (2001)

		Flights	Share
Chicago O'Hare	Annual ATMs	891,000	100.0%
	United	395,000	44.3%
	American	362,000	40.6%
Dallas/Forth Worth	Annual ATMs	739,000	100.0%
	American	484,000	65.5%
	Delta	154,000	20.9%

Source: *Airline Business*, June 2002

US experience suggests two hubs in close proximity are even less likely both to succeed. The larger is likely to prevail as the experience of Midway in Chicago, Baltimore in the Washington area and San Jose in the Bay Area shows. Similarly, both BCal and British Airways failed in trying to establish a second London hub at Gatwick, though traffic levels were lower than they are likely to be in the future. This is because hubs are more lucrative if they enjoy a unique local catchment area where high yield premiums can be obtained to reflect the high level of direct service. In a multi-airport system, the hub which is at the airport preferred by local origin/destination passengers (Heathrow in the London context) will hence enjoy an advantage. Rather than going to a 'second best' airport nearby, it is usually better to create a hub in an alternative city where a near monopoly of the local traffic can be obtained. Airline preference and economic logic suggest that two hubs at the same airport are more likely to succeed than two hubs at neighbouring airports.

If a new airport can offer either a better catchment area than the existing hub and/or much better facilities then it is possible that it could replace the existing hub. It is unlikely, however, that both airports will operate as hubs in the true sense of the word.

Continental has successfully established a new hub at Newark in New York, although JFK remains the dominant airport for local traffic, with La Guardia also close behind. This has been possible despite the size of JFK because until the acquisition in 2001 of TWA by American no single carrier had enough slots to mount an effective hub. A similar scenario might emerge in the London area if BA abandons a high proportion of its European network and focuses primarily on long haul. No single airline or alliance grouping might then have enough slots at Heathrow, unless there is a third runway, to mount a new hubbing operation. In that event, the only option would be to consider Stansted or Cliffe. However, Stansted or Cliffe are always likely to be disadvantaged in terms of their surface catchment area unless Heathrow was to be actually closed down.

4.2 What are the chances of a major alliance grouping (other than BA) developing its own hub at Heathrow?

A priori Heathrow seems well placed to be used as a hub by a second airline group. It is the only European slot constrained airport where a second major alliance grouping appears to have a sufficient share of slots (Star has c.23%) to mount a major hubbing operation. In practice, the opportunity to do this is constrained by the small number of total slots at Heathrow (480,000 ATMs per year) and the dispersed allocation of these amongst airlines. Even for Star, the large number of different airlines involved, most with their own priorities elsewhere, is likely to make it difficult to organise an effective, co-ordinated hub at Heathrow.

Even a three runway Heathrow (with 655,000 ATMs per year) still falls well short of the throughput at the two existing dual-hub airports - Dallas Fort Worth and Chicago which have a capacity of over 800,000 ATMs in a normal year, with a much smaller presence of non-hub carriers within the total - less than 15% (Table 3) versus more than 40% at Heathrow.

An examination of other airports in Europe and the US suggests that the hub airline grouping requires around 400 departures per day to operate a global mega-hub such as is found at Frankfurt, Paris CDG, Amsterdam, Chicago, Atlanta, Dallas, Detroit or Houston (equating to 300,000 or more ATMs per year). A second-tier hub such as Munich, Zurich, Madrid, Charlotte, Cincinnati or Washington Dulles requires around 200-300 departures per day by the hub operator (150,000-225,000 ATMs per year). British Airways and its partners slot holdings at Heathrow are currently just over 200,000 ATMs per year. This suggests that a 2 runway Heathrow cannot be a mega-hub in the longer term. With mixed mode operation it could become more akin to a second-tier hub. Without even this enhancement it is likely to be an 'also ran' hub, serving primarily as an origin/destination airport.

While the second alliance grouping at Heathrow (Star) has around 23% of slots, this only equates to around 110,000 ATMs per year - insufficient to operate an effective hub unless a third runway were to be built.

If Heathrow does obtain a third runway, lifting its capacity to 655,000 ATMs and these new slots are taken up broadly in proportion to existing holdings then BA/oneworld would have about 270,000-300,000 ATMs per year. This should be enough to operate a global mega-hub as the new runway would be mixed mode. But it would not be enough to enable BA to sustain a growing mega hub at Heathrow in the longer term.

The STAR alliance might consider establishing a second tier hub at Heathrow if it succeeded in obtaining at least a 'fair' share of the additional slots created by a third runway especially if it is able to attract other partners with significant slot holdings at Heathrow. STAR would need about 50,000 additional annual slots to be able to mount a second tier hub operation. With 160,000 or so slots mounting a significant hubbing operation at Heathrow becomes an attractive proposition. The most attractive solution would be to join up with Virgin Atlantic, the most important non-aligned carrier and one in which STAR member SIA owns 49%. A merger or alliance between Bmi and Virgin seems almost inevitable because the economic logic is so strong. Though Virgin would only add about 10,000 slots per year, it would help create a strong rival long-haul network to that of BA. It would, however, appear almost impossible for STAR to create a major hub at Heathrow, even with three runways, because it could not, in the medium or longer term, gain access to 300,000 annual slots.

In brief, with only two runways at Heathrow the chances of a second hub being developed there are fairly small. With a third runway the chances of this happening are substantially improved. But for the second alliance grouping this would be a second tier hub rather than one of its major hubs.

4.3 What is the likelihood of an alliance grouping transferring to either Stansted or Cliffe?

A priori, Cliffe is more attractive than Stansted as the potential site of a new hub, should an alliance grouping wish to transfer services from Heathrow. This is so for two reasons. First, because the opening of a two-runway airport at Cliffe would bring on a large increment of additional capacity at one time, allowing considerable scheduling freedom for any alliance moving there. The SERAS report seems to envisage that Stansted development could be more phased (one runway at a time). This is not conducive to creating a hub, as one can't create the waves of arrivals followed by departures without having enough slots to play with at one go – the existing Stansted runway capacity being largely used up with low-costs already. Second, unless the low-cost carriers themselves move from Stansted to Cliffe, an alliance grouping at Cliffe would not face, initially at least, head-to-head competition with low-cost carriers with the downward pressure on short-haul yields that this would create. On the other hand, a new airport at Cliffe would mean five large airports serving the London and the South East and yet effective hubbing requires concentration of services and flights on one or two mega airports. Services from Cliffe would also face some competition from Gatwick services, possibly even on some long-haul routes.

With only one new runway at Stansted in 2011 in the first instance (SE Consultation Document, Section 9.10 p.64) it would be extremely unlikely that an alliance grouping would start a hub at Stansted with 40% of long-haul services moving from Heathrow.

Because bmi as a STAR member could provide both UK domestic feed and a wide range of European feeder services, it would appear that the STAR alliance is the most likely to transfer its services to Stansted or Cliffe. However, the alliance faces a major dilemma in doing this. If the group, including bmi, moved all its services out

of Heathrow it would liberate a large number of slots, many of which could be taken up by BA. This would reinforce BA's competitive position vis-à-vis bmi and the STAR alliance and further entrench BA at the airport, which is most likely to generate a premium on yields. It is unlikely that all STAR members, including United or SIA, would want to offer the BA grouping such an advantage. The alternative for STAR would be to transfer some but not all their services to Stansted or Cliffe. Splitting flights between two airports in the same region is not the best way to launch a hubbing operation!

Much depends on what happens at Heathrow. If Heathrow remains with two runways, the most likely scenario for STAR (or any other non-BA alliance) would be for it to overspill new routes and additional frequencies on existing services to Stansted or Cliffe. In essence to split operations but not to develop a hub at either of these airports. In the longer term, as more services and routes are developed at Cliffe or Stansted, because of lack of Heathrow slots, and as the enlarged airport gains passenger and market acceptance, STAR may consider developing a hubbing strategy at one of these airports. For reasons stated earlier this is more likely at Cliffe than Stansted. In practice, however, rather than wait for this build-up to happen they are likely to focus on building up their hub or hubs in continental Europe.

If a third runway was decided on for Heathrow as well as additional runways at Stansted or Cliffe, then the most likely scenario is that STAR would continue to focus on developing more services at Heathrow taking advantage of the additional slots made available. STAR could, as mentioned previously, develop a second tier hub at Heathrow. This would become more likely if Virgin Atlantic were to join this alliance. Once the new slots were used up, bmi and STAR would move their additional flights or new routes to Stansted or Cliffe but would not be in a position to build up a hub there.

Skyteam, rather than STAR, would appear to be the alliance grouping most likely to set up a hub in Cliffe, or more especially Stansted. First, because it would not have enough slots even in a three-runway Heathrow to set up a limited hubbing operation at Heathrow. Second, because, through KLM UK and Buzz, it has experience of operating from Stansted and also has some prime time slots there. Third, because operators such as Delta or Continental flying trans-Atlantic services into Gatwick may be willing to try an expanded Stansted or a new Cliffe rather than switch to Heathrow, when a new UK-USA bilateral makes this possible. On the other hand, if KLM does join the Skyteam, the latter grouping is likely to consider that a long-haul hub in London would be too near to its Amsterdam and Paris hubs and would merely undermine them. If a third runway is built at Heathrow and the STAR group begins to develop hubbing operations there, then the probability that the Skyteam would develop a third hub in the South East is negligible.

While the South East is currently the major generator of air travel in Europe, the fact that it has five runways scattered on four sites (including Luton) makes it relatively unattractive as a base for hubbing. If a third runway is built at Heathrow, the chances of an alliance grouping setting up a hub elsewhere within the next 15 years or so is minimal. If no runway is added to Heathrow the chances of a grouping transferring to Stansted or Cliffe clearly rise, especially if the runway expansion takes place at Cliffe. But the most likely scenario is that the attractions of flying from Heathrow and the fear of leaving Heathrow to BA will induce alliances, and the STAR alliance in

particular, to split their operations between Heathrow and the new site rather than transfer all operations to that site.

4.4 What policy instruments could be used to create a successful second hub?

A policy decision in favour of Cliffe rather than Stansted as the location for new infrastructure is more likely to create a second hub because a major airline or alliance relocating there will not have to compete with well entrenched low-cost carriers, and, as mentioned above, many more slots would be immediately available than at Stansted with a second runway.

A decision not to build a third runway at Heathrow would increase the chances of a second hub being developed at Cliffe or Stansted. This would however make it less likely that a second hub would develop at Heathrow (and BA would be left with its existing sub-optimal hub at Heathrow). The most likely grouping to develop a hub at Stansted would be Wings/Skyteam because KLMuk/Buzz already have experience of the airport as well as some existing services and slots.

The closure of Heathrow would be the only policy certain to force creation of a hub or multiple hubs at Stansted or Cliffe! With a suddenly level playing field in this situation and a four runway airport, it is likely that another alliance grouping beside BA would try to create a London hub, as well as BA relocating its own hub.

The closure of Gatwick is another policy decision that might accelerate the development of a hub at Cliffe or Stansted. This may still not build sufficient critical mass until the longer term, however.

Otherwise, policy initiatives are at best likely to have a marginal impact. Hubbing depends essentially on the airlines, not the airports or governments. Some encouragement could be made by differentiating airport charges so that transfer passengers at the new hub pay very little as at e.g. Amsterdam. However this is only a small part of airline operating costs (less than 5%) and insufficient to offset a major drop in yields from local passengers by relocating. In the past, traffic distribution rules have helped prop-up Gatwick's network against that of Heathrow. However, these may no longer be legally feasible under EU competition rules.

Liberalisation of bilateral agreements between the EU and third countries, especially on the question of nationality, could help foster a second hub, as it would at least provide the opportunity for another EU airline beside BA to build a hub network from London.

4.5 In the absence of an alliance transferring to either Cliffe or Stansted, how might the new or expanded airport develop?

The most likely scenario is that 'more of the same' will continue when an expanded airport becomes available. Airlines will concentrate long-haul services on Heathrow and there will be a spillover or 'trickle down' of mainly short-haul routes to the other airports. BA will presumably favour Gatwick for this role but the other airlines and

alliances are perhaps more likely to put these routes into Stansted or Cliffe unless they already have a significant presence at Gatwick.

It is possible that BA may relocate its entire Gatwick operation to Cliffe as this would provide an opportunity to colonise the new airport without impairing the Heathrow operation. In any event, there is likely to be a trade-off between the fortunes of Cliffe and Gatwick as they overlap significantly in terms of their potential catchment areas and market functions. If Gatwick remains successful, Cliffe is likely to be a 'white elephant'; if Cliffe takes off, it is likely to crush Gatwick.

Stansted is likely to be less popular than Cliffe as an overspill venue, with more of a continuing role for Gatwick. Carriers such as Lufthansa, SAS and Alitalia have tried routes from Stansted in the past but most of these have now been surrendered to the low-cost competition. An important achievement of the low-cost airlines has been their ability to move passenger volume from airports which for the major airlines were unmarketable, and the extent to which this can continue beyond the short-haul point-to-point market will be critical in assessing the future development potential of these airports.

At Stansted the major expansion is likely to be from the existing low-cost carriers. It is possible that they may start moving into longer-haul operations if bilateral agreements permit (Southwest now operates some transcontinental routes in the US such as Baltimore-Los Angeles). However, the relative economics of long-haul low-cost services are poor, except perhaps in pure leisure markets such as Orlando, where the charter airlines fill the low-cost role. There is so much scope for expansion within the Europe-Mediterranean region that low-cost, no-frills airlines are unlikely to venture into true long-haul for many years.

At Cliffe the potential development pattern is more uncertain. The low-cost airlines are likely to show similar inertia in favour of Stansted as the major carriers have shown in relation to Heathrow. Only in the medium to longer term, as demand grows substantially, are low-cost carriers likely to have to disperse to Cliffe as well, particularly if in the meantime transfers away from Gatwick make capacity available there.

It is likely that peak-hour capacity will be used up first on any additional runways that are provided and airlines may shuffle some services between the London airports (other than Heathrow) to take advantage of better slots that become available. Charters in particular may move to a new or expanded airport with more relaxed night-time operations and flexibility during the day. This does not tend to optimise use of runway capacity around the London airport system as a whole, however.

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