An international study of the airport choice factors for non-integrated cargo airlines

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An international study of the airport choice factors for non-integrated cargo airlines

by

John Gardiner

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2006

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Abstract

An international study of the airport choice factors for non-integrated cargo airlines

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Recent forecasts predict that the current number of all-cargo aircraft worldwide will more than double over the next 20 years, spurred on by trends such as reduced passenger belly hold capacity on short and medium haul routes and a growing recognition of the profit potential of cargo by airlines. At the same time the number of airports looking to attract cargo airlines is increasing leading to a greater number of location decisions being made by cargo airlines and more competition between airports for these services. For the increasing number of secondary and industrial airports in particular, a detailed understanding of the needs of freighter operators at airports is crucial in order to be able to compete effectively for a growing number of freighter services which have traditionally favoured the major gateway airports.

This thesis utilises an international survey of both cargo airlines and airports, in-depth interviews with cargo airlines and airports, and a case study focusing on an airline choosing an airport, with the aim of advancing the limited current knowledge on the factors influencing non-integrated cargo airlines' choice of airport. In particular the thesis focuses on identifying the importance of these factors in parallel with an assessment of the methods used by airports to attract cargo airlines in order to recommend improvements to airport marketing to air cargo carriers and to identify characteristics that airports must display in order to increase their chances of attracting cargo airlines.

The conclusion of this thesis is that cargo airline location decisions are ultimately profit motivated with a trade-off between potential revenue, manifested from the likely demand for a service at a particular airport, and the costs associated directly and indirectly with operating to that airport. However location decisions are not made in isolation and it was found that the location of freight forwarders and other airlines was an important influence on cargo airlines. As a result of the research 10 airport characteristics were identified as advantageous in terms of attracting cargo airlines, these including direct highway access to the main areas of demand, a freight forwarder presence, a positive reputation for cargo established over time, and a fully operational cargo terminal. In exploring the implications of this thesis on airport marketing, it was identified that more emphasis needs to be placed on promoting demand and ultimately 'success' needs to be appraised over the long term.
ACKNOWLEDGEMENTS

The work in this thesis would not have been possible without the guidance and assistance of a number of people and organisations.

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I would also like to acknowledge the staff and my fellow researchers in the Transport Studies Group at Loughborough University – it has been an honour to work in the department’s friendly, cooperative and supportive environment. Special thanks must go to Dr. Ian Humphreys, who as my joint supervisor during the early stages of writing this thesis, when it seemed such an incomprehensible task, provided expert guidance and support.

Thank you also to my friends and family for not asking too many questions and for taking my mind off things when I needed a break.

Finally it is impossible to believe that I could have completed this work without the tireless support of my supervisor Dr Stephen Ison whose door was never closed and whose motivation and dedication proved contagious.
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GLOSSARY OF TERMS

Throughout the thesis a number of terms are used that are specific to the air cargo industry, the most common and important of which are defined here for ease of reference.

Air cargo / Air freight
Air cargo refers to any goods carried in an aircraft excluding passenger baggage. This is typically broken down into freight and mail. In this thesis the terms air freight and air cargo are used synonymously. However mail is typically an insignificant proportion of goods carried by cargo airlines and all figures and statistics quoted are just for air freight except where noted as being for air cargo.

Freighter operator / cargo airline
These carriers are the focus of this research and throughout the thesis the terms freighter operator, cargo airline and air cargo carrier are used synonymously to refer to an operator of an aircraft that only carries cargo and does not carry passengers on a revenue basis.

Integrated carrier
Cargo companies providing a complete service offering to its customers bringing together pickup, airport-to-airport transportation, and delivery along with all of the supporting ancillary services. Integrators are usually synonymous with a carrier providing "express" services.

Non-integrated carrier
Non-integrated airlines, which are the focus of this research, operate freighter aircraft between airports and do not provide the other necessary services involved with moving cargo from A to B. Non-integrated carriers can operate on a scheduled to a fixed timetable, or a charter basis where they operate to the demands of customers.
Freighter aircraft
An aircraft used to carry cargo only, rather than a combination of passengers and cargo. Such aircraft can carry cargo on the main deck and also the lower “belly hold” deck.

Freight forwarder
The middle man between the shipper and the freighter operator. To the shipper the forwarder is the airline as they receive the freight from shippers and arrange for it to be transported to its destination. Freight forwarders usually consolidate many small shipments into larger units which are then tendered to the freighter operator as one shipment for which the airline will charge a lower rate.

Shipper
The company that is actually sending the goods from A to B, for example a computer manufacturer in Asia sending assembled computers to the United Kingdom for sale.

Cargo handling agent
Provides airport services for airlines which may include loading and unloading of the aircraft with the provision of necessary equipment, use of a cargo terminal and aviation services such as pushback of the aircraft. Whilst some airlines self-handle, the majority outsource this activity to outside companies.

Combination carrier
An airline that operates both freighter and passenger aircraft

Belly hold cargo
Cargo carried in the “belly” or lower cargo hold of passenger aircraft flown on revenue passenger routes.

Interline
The movement of a shipment between two or more different carriers via a connection.
Intermodal facility
Enables a shipment to be transferred from one form of transport to another, for example from aircraft to train or ocean vessel.

Yield
Revenue derived per unit of traffic carried. This is typically revenue per freight tonne kilometre/mile (i.e. one tonne of cargo carried one kilometre/mile).

Major Gateway Airport
An airport with a large volume of passenger and freighter operations, typically serving a major city and acts as a significant entry point for the respective country.

Secondary Airport
An airport that is typically of subordinate status to a larger airport in the same region with fewer airlines and fewer prestige international services.

Industrial Airport
An airport that handles solely cargo traffic. Typically (although not exclusively) these are recently developed airports, often converted from past military use.
1. Introduction

"Your topic is an excellent one and is very pertinent to Winnipeg Airport and our development" - Michael Crockatt, Manager for cargo and logistics, Winnipeg Airports Authority.

1.1 Research purpose and rationale

In recent years there has been a substantial growth in the number of airports vying to attract the services of cargo airlines, as the passenger market has contracted leaving many airports with excess capacity. In this time a number of new airports have also been established, for example Vatry Airport, France, Alliance Airport, Texas and Kent International at Manston, UK. Such airports are typically converted from ex military use for the primary purpose of serving cargo airlines restricted at the major gateways. With so many airports vying for the services of relatively few airlines it has become important for airports to understand the specific needs of cargo airlines in order to effectively target such carriers. The purpose of this thesis is to achieve an understanding of the factors influencing the locations of non-integrated freighter operators to aid airports in working efficiently to attract them.

The rationale for focusing on non-integrated carriers is two-fold. Firstly such airlines carry the majority of air cargo (Boeing, 2004) and are therefore a significant presence at many airports worldwide. Table 1.1 lists the top 10 cargo airlines by total freight tonne-kilometres in 2004 and shows the importance of non-integrated carriers (highlighted in bold).
Table 1.1: The top 10 cargo airlines in 2004 based on total freight tonne-kilometers flown with % change from 2003 and average % change since 1999.

Source: Air Cargo world (2005).

Notwithstanding the fact that two of the largest carriers (FedEx and UPS) are integrators and have experienced phenomenal growth over the past 20 years, recent analysis has shown that international integrator/express traffic growth has slowed as non-integrated carriers have adapted their operations to compete (Boeing, 2004). The wave of new aircraft orders and other aircraft acquisitions experienced in the period 2004-2006 by non-integrated carriers suggests that these carriers will be heavily involved in locating new services in the future.

The second important reason for focusing on non-integrated carriers is that to date there has been no substantial research into their location decisions (as detailed in chapter 2) with the majority of research instead focusing on the hub choice of integrated carriers. Therefore there is the opportunity for this research to contribute significantly to the work on location choice. The fact that this research is needed and welcomed by industry (as seen by the epigraph) and adds to academic knowledge provides a sound rationale for researching the airport choice factors for non-integrated cargo airlines.
1.2 Significance of the research

This research is significant today, but will become even more so in the future as long term forecasts from Airbus (2004) and Boeing (2004) predict an average 5.9% and 6.2% annual growth in freight tonne kilometres over the next 20 years. This compares with a forecasted 4.8% growth over the same period for passenger traffic (Boeing, 2005).

The projected growth for cargo reflects a continuation of the actual growth that the air industry has experienced in the past decade, growing by 6.1% between 1993 and 2003 (see figure 1.1).

![Figure 1.1: Historic and projected growth in worldwide air cargo traffic 1993-2023. Source: Boeing (2004).](image)

Within the forecast period to 2023, Airbus (2004) predicts the freighter fleet will more than double from 1,506 to 3,616 aircraft (see figure 1.2). Air cargo industry trends such as reduced passenger belly hold capacity on short and medium haul routes, a growing recognition of the profit potential of cargo by airlines and modal shift from ocean freight due to port congestion and the need for faster movement of goods, together with increasing globalization add further weight to the forecasts of freighter aircraft growth (Clancy and Hoppin, 2005).
Arguably the most important decision for a cargo airline is that of which markets to serve and which airports within these markets to fly to. With the continued growth in passenger services, many major airports will be unable to keep pace with this freighter growth leading to a more complex decision making process with the freighter operators having to look at an increasing number of alternative airports.

Additionally these location decisions have to be continually re-assessed for a number of reasons such as a changing economic climate, actions of competitors or imposed legislation. The result is that the relocation of freighter services either within or between regions is not uncommon – especially for non-integrated carriers given their relatively footloose nature. For the increasing number of secondary and industrial airports pursuing a growing number of freighters, a detailed understanding of the needs of freighter operators at airports is crucial, particularly given the dearth of existing research in this area.

**Figure 1.2:** The number of dedicated freighter aircraft will more than double by 2023.  
1.3 Research aim and objectives

The aim of the research is to identify the most important factors influencing non-integrated cargo airlines' choice of airport. The thesis details specific factors that cargo airlines consider when choosing an airport and these findings are important in terms of assisting airports in attracting such carriers.

As a means to achieving the aim, objectives have been identified. These objectives are to:

1. Examine the existing literature in the area of cargo airline location decisions to identify the nature and extent of current knowledge.

2. Evaluate the extent of linkages between key theories of location and the airport choice of cargo airlines.

3. Establish the prevalence and applicability of the cargo airline location factors identified from the literature and relevant theories.

4. Examine the location factors in context.

5. Identify the processes involved in an airline choosing an airport to serve with particular emphasis on the airline-airport relationship.

6. Identify the main methods adopted by airports to attract freighter operators and examine whether their actions mirror what the freighter operators find important in an airport.

7. Identify factors that may potentially lead airports to succeed in attracting non-integrated freighter operators and make recommendations for any necessary changes to air services marketing practices based on the findings from freighter operators and airports.
1.4 Research delimitations

The air cargo industry has a number of facets, each with their own individual characteristics. Following a thorough review of the literature relating to airport choice for cargo airlines three primary delimitations were incorporated. These are:

1. **Focus on non-integrated carriers only.** Little work has been carried out on airport choice for non-integrated freighter operators. It is contended that non-integrated carriers have different priorities when choosing an airport compared with integrators such as FedEx and UPS who combine flying aircraft with ground and terminal operations and have been the subject of much past research.

2. **Focus on scheduled services only.** Whilst there are a number of airlines focusing on cargo charter flights, the airports these are operated to are often dictated by the charterer and therefore of much less interest and relevance to the airport community than the motivations of carriers that will operate regular schedules.

3. **Focus on selection of non-hub airports.** There has been much written on airport hubs, yet no thorough research on the choice of airports for normal point to point operations, which are much more commonly chosen and less restricted in terms of physical space and capacity requirements at airports. Throughout the thesis reference is made to choosing an airport to fly from or to fly to and these terms are used interchangeably within the context of this delimitation.

1.5 Thesis structure

The thesis structure follows the objectives established in this chapter in order to ultimately identify the most important factors influencing non-integrated freighter operators. Chapter 2 reviews current literature relating to the airport choice of airlines in order to establish the extent of current knowledge and to begin to build a list of factors deemed important by cargo airlines which forms the basis for subsequent chapters. Following this theme chapter 3 focuses on the theory of location in order to establish the theoretical linkages between key theories of location and the airport
choice of cargo airlines as the thesis progresses. The fourth chapter states the research propositions based on the literature and theory, and also explains the epistemological stance of the research and the method chosen in order to achieve the research aim. Findings from the methods discussed and chosen in chapter 4 are presented in chapters 5, 6 and 7, namely from an international survey of airlines and airports, a series of airline and airport interviews and a case study focusing on an actual, recent location decision.

These findings are discussed together in chapter 8 in the context of the theory, past literature and research propositions. These ultimate findings are stated in chapter 9 which concludes the thesis and makes recommendations both to airports in terms of their strategies to attract non-integrated freighter operators, and to academics researching this, and related topics in terms of future research directions.

1.6 Conclusions

This chapter has demonstrated that a study of the location decisions of non-integrated cargo airlines is a necessary addition to the body of existing research on airport choice both for the advancement of academic knowledge and to address problems that airports are facing due to increased competition. Chapter 2 confirms the need for research in this area by identifying this important gap in existing research. The non-integrated sector is the largest provider of freighter lift worldwide with strong projected growth and as such this important, yet under-researched facet of the airline industry is an important subject for study in this thesis.
2. The geography of cargo airlines: A literary background

2.1 Chapter Overview

This chapter presents a detailed literature search aimed at generating an understanding of the current knowledge with regards to the airport choice factors for non-integrated cargo airlines. As such, this chapter is crucial to ensuring that the thesis adds to the knowledge in this area rather than repeating previous work and is also important for guiding the direction of this research by aiding in the generation of research propositions.

There is a dearth of academic literature relating to airport choice, particularly that relating to the airport choice of non-integrated cargo airlines. This chapter therefore draws on the dearth of literature there is relating to the choice of airport by freighter operators and makes substantial use of literature in related fields, particularly the location of passenger carriers and integrators so as to form a detailed case of the main underlying themes relevant to the research. There is however a great deal of synergy that makes research into these areas compatible and worthy of review. For example Dennis (1994) identifies good airport facilities such as ample runway and terminal capacity as a crucial deciding factor for passenger operators choosing a hub. Literature relating directly to cargo airlines also supports this line. For example Conway (2000) in identifying reasons for the success of Glasgow Prestwick Airport in attracting freighter aircraft refers to the airport’s abundant capacity and long runway.

The literature reviewed comprises three main elements, namely published academic material, notably literature relating to passenger hub location, airport quality, and network configuration, as well as independent or government reports and other published literature such as airline industry serials.

This chapter is structured into three main sections based on the content of the literature. These are: location, which looks at the importance of geographical location and local air freight demand on the airport choice; airport quality, which analyses the influence of certain airport attributes such as charges and facilities (including ground
transport links) in attracting cargo airlines; and third-party influences which highlight the increasing list of factors largely out of the control of the freighter operator that may work to dictate their choice of airport. Table 2.1 presents a detailed summary of the structure and content of this chapter.

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Table 2.1: Categories and sub-categories used in the review of literature.

2.2 Location

The literature strongly suggests that the location of an airport is the top-level factor that first attracts the attention of a freighter operator and that this will often dictate a short list of airports to assess in terms of operating restrictions and airport quality, which will further refine the search. The term location is used here not only to analyse the importance of the geography of airports but also to assess the influence local demand and weather conditions have on the initial location decision of freighter operators.
2.2.1 The geography of airports

Dennis (1994) examines passenger airline hub operations in Europe and cites a central geographical location in relation to the markets served as important to minimise flying time and cost. In air cargo terms this can be the cost of trucking freight to and from the airport, which can also increase transit times. In support of this it is widely reported (see O'Kelly 1986 and Noviello et al. 1996) that the most important reason behind hub location for cargo carriers is to get packages delivered on time.

O'Kelly (1986) used a Weber least cost location model to determine the most appropriate site for a single overnight air package network in the USA. He found that the area surrounding Southern Ohio is most efficient in providing access to the national market. The authors' empirical results are consistent with the actual hub location decisions of Emery, Airborne and DHL, who all have hub facilities close to the sites identified by the model (the Ohio Valley). Noviello et al (1996) and Harris (1954) also highlighted this area as the most appropriate location for a national cargo hub due to the central location and its minimum aggregate transportation costs for serving a national market from a single site.

Hall (2002) details how the hubs of FedEx and UPS were selected because of their central location relative to the US population, their minimal snowfall and the attractive labour environments i.e. an abundance of skilled labour. Crucially Hall also highlights the importance of geographical location to the selection of airports by non-integrated carriers. He identifies that the major airports serving cargo airlines in the US tend to be either coastal to serve international traffic or in the centre of the country to act as a domestic hub.

Wensveen and Humphreys (1998) used a centrality index to determine the most geographically suitable hub airport location to serve the European passenger market post liberalisation. The authors found that the most suitable location in Europe in terms of proximity to major population areas (excluding the local catchment area) was the area linking Dusseldorf, Brussels and Cologne airports, referred to as the "Golden Airport Zone". These three airports are far from the busiest passenger hubs in Europe, but interestingly this zone has considerable cargo (particularly integrator)
activity with DHL based at Brussels and UPS based at Cologne. This suggests that integrators have based their choice of a European hub on a central location to best serve a variety of markets. As Wensveen and Humphreys (1998) acknowledge however, a practical assessment of potential sites is needed with respect to economic, environmental and political factors and that airlines cannot rely on the airport with the "ideal" geographical location being suitable based on these factors.

Buyck (2002) identifies that freighter operators can find advantages in locating at an airport that minimises their flying time, citing carriers that have chosen Manston (65 miles south east of London) as their London airport in order to avoid the London Air Traffic Control area when flying from the south. This reportedly saves up to 45 minutes flying time and 20 minutes taxi time compared to Heathrow and Stansted. The argument behind this is that extra flying time is more expensive than the cost of trucking as not only is there extra fuel costs but there may also be extra ACMI (Aircraft, Crew, Maintenance and Insurance) costs for some carriers.

This view is strengthened by Elston (2003) who found that carriers using Chateauroux in France rather than the Paris airports were saving up to 1 hour and 40 minutes flying time, equating to 15% of the rotation cost. Given that overall transit times to central Paris are comparable, Elston found that airlines are therefore viewing Chateauroux as a viable alternative.

2.2.2 Local demand

"Location alone does not establish the comparative advantage of a site" (Huston and Butler 1991, p.977). The size of the market also affects the profitability of operating a cargo service there and good access to markets is the most important factor influencing international location decisions (A&TC and OEF, 2002).

Gordon Bevan, Senior Consultant at Airport Strategy and Marketing (ASM) for example, believes that without a strong supporting regional economy and liberal operating conditions, it is unlikely that any airport can sustain viable airfreight
operations (ASM, 2000). The author believes that successful cargo airport operations fall into one of the following categories:

- An existing passenger hub airport, providing access to significant belly-space capacity;
- Regional economic requirements (such as the computer industry);
- A dedicated cargo hub by either an integrator, or as an alternative airport for a large passenger airline’s freighter services.

Burghouwt et al. (2003) too find that the network configuration of an air carrier (in this specific case a passenger carrier) depends on the size of the origin-destination market, whilst Zhang and Zhang (2002) concur, identifying the key determinant of overall air cargo volumes for most airports as the size and scope of the local origin destination market, with freighter operators choosing the airports which will yield more cargo to make better use of their fleet capacity. Research from consultants Mergeglobal (MidAmerica Airport, 2004) found that non-integrated cargo airlines are particularly attracted to regions with certain types of industry, those which are subject to one or more of the following:

- Physical perishability
- Economic perishability
- Business process impairment
- High product value

MergeGlobal’s research, which is used by MidAmerica St Louis Airport to show that their region has the industry that cargo airlines would find appealing, shows a number of industries that when present in a region serve as magnets for cargo airlines resulting from meeting one or more of the above characteristics. These industries are summarised in table 2.2.
Airports that are located close to clusters of technology production, pharmaceuticals, automobile assembly or fashion clothing production, therefore have a vastly increased chance of attracting non-integrated freighter operators than airports located away from such industries.

An example of this used by Conway (2000) concerns the success of Glasgow Prestwick Airport in attracting freighter operators. He finds that part of its success is due to the airport’s close proximity to ‘Silicon Glen’ an area of high electronics production in Western Scotland where the main IBM manufacturing plant for Europe is located. Through interviews with the key players, Conway finds that Prestwick’s location as the closest airport to Silicon Glen capable of handling wide body freighter aircraft has a significant bearing on the popularity of the airport with cargo airlines.
On analysing Hong Kong as an international air cargo gateway, Zhang (2003, p.134) found that “airports that are closer to shippers and have lower total costs and lower delivery times inevitably are strong candidates for a regional air cargo hub. This suggests the importance of geographical location, costs and delivery times as competitive factors in a regional and global competition among airports to attract cargo traffic”.

The idea that local industry can affect freighter operator’s choice of airport is further developed in other publications. In the specific case of Nottingham East Midlands Airport, Taylor (1998) identifies the existence of local manufacturing such as the nearby Toyota factory as an important element in attracting freight forwarders to the airport and in encouraging dedicated freighter services. Whilst a single factory itself may not have an immediate impact, a cluster of factories each with products requiring movement by air transport may be influential.

The United Kingdom Airfreight Study Report Stage 2 (DETR, 2001), developed by consultants MDS Transmodal, finds that long haul cargo services from some UK regional airports may depend on base load contracts (where a shipper regularly contracts (and pays for) a certain amount of space on an aircraft). As such contracts are often based around new services to share the risk, the second party may dictate from which airport the service is to operate and this will clearly be close-to their particular market to minimise their own costs.

O’Kelly (1998, p.173) links this issue with classical location theory. “In the typical location model such as the Weber problem it is usually safe to assume that service will be provided to the user from the nearest facility”. If users of cargo services, i.e. shippers and freight forwarders, make use of the service closest to them then the importance of cargo airlines locating close to industry is heightened.

2.2.3 Operational availability

Dennis (1994) highlights that weather conditions can affect the operational reliability of airports and thus the likelihood of passenger airlines operating there. Huston and
Butler (1991) also stress the importance of climatic conditions as inclement weather such as thick fog or strong winds can cause delays and airport closures which airlines are clearly eager to avoid. They included inputs such as the number of days per year of fog as well as thunderstorms and snow into a model of hub location for passenger airlines and found snow to be the most significant cause of delay, being the only factor significant at the 5% level in their regression results.

The weather record of an airport may be of even more importance for cargo operators over passenger flights, as shipments tend to be time definite with the carriers having to offer a reliable and efficient service, often at night. "The unique feature of overnight (air) transportation is the requirement that all shipments be completed within a limited time frame" (Hall 1988, p.139). If an airport had to close on a regular basis due to weather, their service promises would not be met and their business would be severely affected. The more services an airline plans to operate into an airport the more of a disincentive this would be.

San Francisco can be seen as an example of this. For several years, San Francisco has been responsible for more arrival delay per flight than any other US airport (Mehndiratta et al. 2002). The nature of San Francisco's local climate, a combination of summer fog and winter rainstorms make weather a primary issue for airline operations, as the airport suffers persistent severe flight delays whenever these conditions exist. The airport is a major passenger gateway, although has limited freighter services, with many operating from nearby Oakland. Bruzzone et al. (2001) suggest this is due to a combination of poor weather and congestion at San Francisco, despite its high local demand.

2.2.4 Location Literature Summary

- Cargo airlines prefer to operate from airports close to the markets served;
- Some freighter operators may wish to minimise flying time by operating from an airport closer to the origin;
- A strong origin-destination market is required;
• Airports in regions with clusters of technology production are particularly attractive to cargo airlines;
• Base load contracts may dictate the location of the airport;
• A bad weather record acts as a deterrent to new operations.

2.3 Airport quality

Adler and Berechman (2001) used data envelopment analysis to analyse the quality of airports from the passenger airlines viewpoint and identified that for passenger hub choice "airport quality levels should be a part of the hub location choice problem" (Adler and Berechman 2001, p.180). Based on a questionnaire sent to 61 airlines and other information collected from a variety of sources, they found that efficiency and quality of airports have a strong impact on the airlines choice of hubs. They identified that factors such as delay data, runway capacity, airport charges, local labour force costs and the reliability of air traffic control must be considered by an airline choosing a hub. These are discussed below.

2.3.1 Congestion and delays

Aircraft do not make money while on the ground and it is therefore important for reducing turnaround times and increasing operational flexibility that freighter operators look to reduce where possible time spent on the ground. The main obstacle to this is airport congestion which can cause severe delays and restrict the number of slots available to airlines. Freighter operators therefore look to operate from less congested airports, particularly in a hub location scenario. "Slot restrictions at established international hubs like Schiphol, Heathrow and Frankfurt are exactly what drives carriers and integrators to secondary airports" (Buyck 2002, p.73).

Again using a passenger example, Berechman and de Wit (1996) summarised that slot availability and capacity constraints have an important impact on airport hub choice for passenger airlines. In many cases a carrier’s first choice airport may not be
available due to slot constraints caused by congestion. As Dennis (1994, p.225) states: “A congested airport is unlikely to provide sufficient flexibility to obtain slots at the desired times, to develop new routes and to maintain good reliability”. Many freighter operators for example would ideally locate at Heathrow Airport, which due to high levels of congestion, slot constraints and other legislative reasons is not possible.

Camasso and Jagannathan (2001) employed stated preference models to determine why general aviation pilots choose to base and operate their aircraft at some airports and not others. They conducted interviews with the local pilots association, the office of aviation and a sample of 15 pilots and distributed a wider questionnaire to pilots. From this study they found that the principal disincentive to a general aviation pilot’s airport choice was heavy airport congestion. Their study found that this decreases the probability of airport selection by between 22% and 35%.

Avoiding significant delays must be a priority for integrators selecting hub airport as “small amounts of delay can impose tremendous cost, and possibly force late deliveries...” (Hall 2002). Adler and Berechman (2001) included delay data measured by average delay per aircraft movement into an airport efficiency model, which had a significant impact on their efficiency rankings. The authors felt that delay data was an important element in defining airport quality and ultimately a passenger airlines’ choice of airport.

2.3.2 Airport user charges

Dennis (1994) introduces the idea of airport charges being a deciding factor for passenger airlines in choosing between comparable locations, whilst the UK Airfreight Study Stage 2 (DETR 2001) argues that freighter operators choose airports which allow them to minimise their costs and to offer a competitive level of service.

Airport user charges at airports are classified into two categories: aeronautical and non-aeronautical (de Neufville and Odoni, 2003). Aeronautical charges are charges for services and facilities directly related to the processing of aircraft and their cargo,
including fees for landing, the use of air traffic services (navigation), and aircraft parking. Non-aeronautical charges (with the exception of fuel charges) are generally concerned with commercial activities.

Gillen and Lall (1997) suggest airport charges in the USA represent 5-7% of an airlines total operating costs with a higher percentage in Europe and Asia due partly to higher fees for navigation. This is supported by Zhang (2003) who identifies that airport charges for Hong Kong’s cargo carriers represent about 7% of total airline costs. However Graham (2001) finds that “airport costs generally represent a relatively small part of an airline's total operating costs” (p.98) and are least important where long-haul operations are being considered, since the charges are levied relatively infrequently.

Ohashi et al. (2005) find that a time saving is far more important for influencing the cargo routing and choice of transhipment airport than the monetary cost in the form of airport fees. They calculate that a one hour reduction in connecting time could off-set the effects of a $1,361 increase in airport charges. Supporting this argument, Warnock-Smith and Potter (2005) argue that even for low cost passenger airlines, cost is not necessarily the most important factor considered when choosing an airport, rather it is demand to justify the provision of a service and this is what airports should focus their marketing approach on, as opposed to a cost focused approach.

Berechman and de Wit (1996), who studied the effects of the deregulation of European aviation on passenger airlines choice of primary West European hub airport, found that changes in airport charges have a significant effect on a passenger airline’s choice of hub. Whilst airlines may often look at choosing an airport based on that which yields the highest levels of profit, Berechman and de Wit (1996) based their simulation analysis solely on financial inputs e.g. charges and potential revenue from demand. This led them to conclude that London Heathrow was the best location for a primary West European hub airport. This could only be a theoretical choice though as it ignores the realities that Heathrow would be unable to fulfil this role due to a severe lack of capacity.
Extending the idea of charges being one of a number of important factors in choosing an airport, Cullinane and Toy (2000) developed a hierarchy of influential attributes in freight route / mode choice decisions. Using content analysis\(^1\) they examined 75 articles of literature relevant to the subject of freight route choice decisions and recorded the frequency that key words and terms appeared in the text. The authors found the following hierarchy:

1. Cost / Price / Rate
2. Speed
3. Transit time reliability
4. Characteristics of the goods
5. Service

The cost of operating a route, which in this case would include airport charges, was first by a large margin with 23.6% of total mentions, compared with 14.5% for speed. This demonstrates the importance of cost as an issue in the existing literature. However the true influence of airport charges vis-à-vis other factors is inconclusive from the literature and an area for further research.

Rowe (2005a) identifies that handling rates are also important to freighter operators and these are often highest where there is a monopoly supplier. Rowe describes how this has been recognised by Ostend airport, who opened up the ground handling market there in order to create competition and drive down handling rates. Rising fuel prices have also seen this factor increase in importance, with data from the Association of Asia Pacific Airlines revealing that fuel accounted for 28% of their members’ operating costs in 2004-05, up from a more typical 20% the previous year (Thomas, 2005).

\(^1\) Content analysis is a technique that can measure the frequency of different words or more complex measures in a series of documents (Mangan et al, 2002).
Chapter 2 - Literary Background

2.3.3 Infrastructure

The UK Government's Airfreight Study Report Stage 1 (DETR, 2000) identifies the additional requirements of freighter aircraft at airports over passenger aircraft as the need for extra apron space for simultaneous loading and unloading of cargo plus ground handling facilities and equipment. Airports must therefore be suitably equipped in order to allow cargo airlines to operate.

In a review of facilities that are deemed necessary provisions for an airport to cater for freight traffic, the DETR (2000) highlights as important the provision of runways, apron stands, and airside access from the cargo terminal. The DETR (DETR, 2001, p.8) conclude that "location, infrastructure, slots, facilities, road networks and cost all determine the choice of airport".

This is reinforced by Shaw (1993) who states the provision of specialist handling equipment is an important element in the decision criteria for choosing an airport. Some consignments need special equipment and smaller carriers who rely on handling agents at the chosen airport will see this as an important factor in their decision to operate there.

The Canadian Airports Council (CAC; 2000) in a Discussion Paper on air cargo issues finds that for the airlines to continue to satisfy the increasing calls for faster delivery, airports will be required to ensure cargo handling processes, customs processes and ground access all support rapid throughput of cargo. For airports to attract cargo airlines and indeed to keep them they therefore need to respond to a changing industry.

The European Express Association (EEA 1999) identifies a number of key elements for the location of a hub for express operators from interviews, surveys and desk research. These findings confirm the importance of sufficient runway length, 24 hour capability and an adequate supply of labour, but also identify a full length parallel taxiway, a large apron area, space for construction of a major sorting centre, customs facilities, fuelling facilities, a low rate of diversions due to poor weather, and ready access to a principle highway, as major considerations.
The UK Airfreight Study Stage 2 reaffirms the importance of adequate infrastructure for scheduled operators by affirming that because airfreight is dominated by long haul business most operators have little choice but to operate from airports which have the capability to handle the largest aircraft (DETR, 2001). This type of traffic is also less sensitive to trucking as it forms a much smaller proportion of the overall journey and total cost.

Karp (2004) identifies that to ultimately attract cargo airlines, airports should also ensure they have the infrastructure and the commitment to attract road freight operators. He identifies that airport managers are giving too little attention to trucking at the expense of attracting freighter operators, finding that if airports do not incorporate ground freight into their planning cargo traffic will go elsewhere. This is reiterated by the Executive Director of Keiser Phillips Associates, an airport planning consultancy, who finds that “If airports want to increase air cargo services they really need to embrace trucking” (Karp, 2004).

The movement of cargo through the supply chain depends on more than finding the airport with the best facilities though. Customs administration with particular reference to clearance time can also be a consideration, particularly for express operators. Zhang and Zhang (2002, p.284) find that “Any customs administration that can provide reliable, timely customs clearance; or immediate release based on pre-clearance, creates a competitive advantage ...” This is not only an advantage for the airline in terms of speeding up their delivery times, but also for the airport which may become more attractive to carriers for facilitating this fast clearance.

2.3.4 Airport ground access

Given the important interface between trucking and air cargo, particularly for an integrators hub operation, good road links to the airport are crucial. As Hall (2002) finds “Unlike conventional freight, air cargo is often on the roads during peak periods” (in order to facilitate overnight deliveries). Gritschke (1999) finds this makes good linkages to an un-congested road network even more important in order to meet fast overnight delivery targets. Good road access to airports is clearly an
important issue when locating all types of cargo service and the distance of an airport from a major road is highlighted as one of the main issues for freighter operators in the UK airfreight study report (DETR 2000). Through interviews with freighter operators in the UK, Caves et al. (1985) also identified a high level of importance placed on access, finding that the favourable location of East Midlands Airport in terms of its proximity to the road network, was frequently cited as a reason for using the airport.

Road access gains a particular amount of attention with airports promoting themselves as cargo gateways, with Manchester Airport (2000) for example promoting their “superb position at the strategic centre of the UK motorway network” and the fact that “60% of the UK’s manufacturing capacity lies within a 2 hour truck drive of Manchester Airport”.

A concept increasingly developing in the literature e.g. Dennis (1994) and Gritschke (1999), is the importance of intermodal operations at airports, for example rail links to cargo terminals. Cargo is more flexible as to which route it takes (Dennis 1994) than passengers and the development of such facilities may increase the attractiveness for freighter operators of an airport that is not in an ideal location as it would increase ease of access for moving freight from other locations. Gritschke (1999) believes that in the near future cargo terminals at airports will have to provide such facilities in order to provide efficient links for transhipment between different modes.

The importance of alternative forms of ground transportation such as rail will increase in importance as road capacity becomes increasingly scarce. One airport already benefiting from intermodal facilities is Huntsville International Airport, USA, which offers freight rail connections, a nearby industrial park, a foreign trade zone, and an abundance of cargo space, with more planned. The airport is also looking at extending its runway by 4600 ft especially to handle A380 freighter aircraft (Schwartz, 2002). This has led Huntsville to become a thriving cargo hub from a low base, with 11 Boeing 747 freighters every week from Panalpina alone having previously only had modest domestic cargo services and occasional charter flights to Europe.
2.3.5 Labour

Adler and Berechman (2001) describe labour costs as a prime factor affecting airport quality from the airlines viewpoint and the importance of an attractive labour environment is also identified by Hall (2002). This is a particular issue for freighter operators establishing hub operations at an airport, which requires large numbers of staff.

Availability of labour is often a more important hub choice determinant though. A survey by Hall (2002) of cargo airlines operating from Los Angeles (LAX) airport found that for one carrier LAX was attractive as it was easier to retain employees due to its location. Similarly, with reference to the San Francisco airports system, Bruzzone et al. (2001) identify a larger pool of semi-skilled and skilled labour necessary for air cargo handling and maintenance in the East Bay near Oakland than close to the main San Francisco International Airport as a factor in the success of the former in attracting freighter operators. Although not widely cited this has been found to be an important issue.

As well as being an attractive factor, the nature of the labour force can also see this being a factor that discourages airlines from locating in a particular region. Bartik (1985) for example calculated the effect of a state’s unionisation on the location of manufacturing plants. He found that the effect was statistically significant and that a 10% increase in the unionised percentage of a state’s labour force is estimated to cause a 30-45% reduction in the number of branch plants due to the threat of strike action, which is also pertinent to the operation of cargo aircraft and airports.

2.3.6 Airport Quality Literature Summary

- Historic delay data can be an important airport choice determinant;
- Airport user charges are a somewhat important part of freighter operators costs and may have an influence of an airline’s choice of airport, particularly for short haul operations, although the extent of this influence is unclear;
• Airlines need the right handling equipment to handle their particular type(s) of aircraft;
• Cargo airlines require airports with abundant capacity (terminal and runway) for flexibility of operations;
• They require good quality terminal facilities and extra apron space for rapid throughput of cargo;
• Intermodal links are advantageous, particularly links to the rail network for onward movement of cargo;
• Availability and cost of labour can be an important element of the airport choice of cargo airlines, particularly for larger operations. Highly unionised locations may be less attractive.

2.4 Third part influences

In a growing and heavily regulated industry freighter operators are not always able to operate from their first choice airport. The literature has already identified that this may be a function of congestion but in relation to cargo in particular this is often due to operating restrictions such as noise limits, night curfews or official legislation. Page (2003) for example reports that the first thing Northwest Airlines consider when evaluating airports for cargo services is 'what are the vetoes?' i.e. obstacles to an operation such as noise restrictions, runway constraints and weather, demonstrating that such influences are directly considered. The literature suggests that cargo airlines may also be influenced by other organisations such as the airports or freight forwarders.

2.4.1 Environmental restrictions

"24/7 schedules and lack of noise restrictions are decisive attractions for a freighter operator" (Buyck 2002, p.73). The UK Airfreight Study Stage 2 (DETR 2001) affirms that for integrators night time flying is essential and that airports that seek to play a role in the airfreight market must to be able to offer 24-hour access. Such is the
importance of this issue— that the Aviation & Travel Consultancy and Oxford Economic Forecasting (A&TC and OEF 2002) believe that constraints such as a lack of airport capacity and moves to restrict night flights threaten not only the growth of express services but also their ability to serve existing markets.

Worldwide almost 50% of airport movements by the express sector take place at night representing a significant proportion of their business, whilst in the UK some 60% of flights at the major express hubs operated by the four main integrators occur at night. These four integrators (FedEx, UPS, DHL and TNT) accounted for almost 40% of freighter aircraft movements in 2001 (A&TC and OEF 2002). It is therefore clear that 24-hour flying is a must for integrators when selecting an airport. However the literature largely fails to translate this to non-integrated carriers and as such it is not entirely clear as to the full extent of the necessity for night operations from such carriers.

Conway (2002a) does however offer some examples of the impact of environmental restrictions on the non-integrated sector. He identifies that progressive curbs on night flights at Brussels airport, restricting certain aircraft types, including the Boeing 747-400F has led Singapore Airlines and El Al to operate to other airports where these restrictions are not in place. It is the few airports that do have a relaxed night time operating regime that cargo airlines are likely to (and often do) use. For example Delve (2001, p.19) states that “an airport which does not have a 24-hour operation is not as well placed to acquire dedicated cargo traffic”. Imperative however is stability. Freighter operators want to go to an airport that has 24-hour operations and is likely to retain this status so they can make long-term investment decisions (Conway, 2002a).

Shaw (1993) too identifies night-flying restrictions among a number of factors that impact upon the decision of a freighter operator to operate from a particular airport. Of the constraints that have to be overcome he identifies airport runway capacity, noise and night-flying restrictions as important. Above all else though Shaw (1993, p.126) firmly states “It is absolutely essential that (airports) should have completely unrestricted night-time access”. For non-integrated carriers this is contradicted by
Conway (2004) who finds that they generally want day time slots “contrary to popular belief” (p.34).

Humphreys and Watson (2001) develop the importance of noise in the airport choice decision focusing on the integrated carriers in Europe. They found that integrators’ search for new hubs revolves around finding airports with local communities that will tolerate their noise disturbance. Partially in response to noise and night time restrictions at their main Brussels hub for example, DHL devolved some of their services to sub-hubs such as Nottingham East Midlands in the UK (Humphreys and Watson, 2001). As night time restrictions were a significant consideration for the establishment of sub-hubs, the lack of these at Nottingham East Midlands and the other five hubs was obviously a key factor. The Canadian Airports Council (CAC, 2000, p.5) verifies that “the increasing sensitivity of people to aircraft noise is leading to increased focus on the use of second and third tier airports for freight”.

2.4.2 Bilateral agreements

Zhang and Zhang (2002) refer to the influence of bilateral air service agreements in deciding where freighter operators can (or more specifically cannot) operate. In many cases agreements between countries specify particular airports or even particular carriers for a link, preventing airlines from operating services where there is a perceived business opportunity. The Canadian Airports Council highlights the air services agreement between Canada and Japan as an example of this restrictive environment. This agreement specifies which Japanese cities can be served by Canadian carriers and even dictates that Canadian carriers can only serve these cities from Toronto, Vancouver and one other to be named by Canada, currently Calgary (CAC 2000). Carriers wishing to serve Japan from Canada must therefore use these airports even if they perceive a business opportunity from another city.

Zhang’s (2003) study of Hong Kong as an international air cargo hub identifies the problems air service agreements can cause airlines wishing to establish a service. At the time of the research the Hong Kong – China air services agreement made no specific provision for dedicated air cargo services. As a result any cargo carried by
Air was carried in the belly of passenger aircraft, meaning the development of important cargo services was dependent on the passenger services linking Hong Kong with mainland cities. They also have a 'one route, one airline' policy which means that Dragonair (predominantly a passenger carrier) is the only Hong Kong based airline with rights to mainland China, preventing other carriers gaining a foothold in this market.

Air cargo is often directionally imbalanced and therefore direct return journeys can be loss making with one leg having little demand. It is therefore commonplace for scheduled freighter services to operate triangular routes to avoid this imbalance. For international services though this requires fifth freedom rights in order to pick up cargo in another country. The Canadian Airports Council (CAC, 2000) highlights the problems this causes for cargo carriers. They recognize that the exchange of fifth freedom rights is typically caught up in passenger service issues rather than cargo. With passenger flows more directionally balanced the agreements are often developed to suit these carriers. This is a hindrance to international cargo carriers and can influence which airport in which country a service is operated from.

2.4.3 Government legislation

In international markets some airports can also be disadvantaged by the policies of their government relative to those of neighbouring countries with competing airports. One such example is provided by the Canadian Airports Council (CAC, 2000), who identify that government policies with respect to the cost of providing air services and infrastructure have disadvantaged Canadian airports relative to those in the USA. For example airport ground leases, corporate capital taxes and infrastructure financing are disadvantageous in Canada compared to the USA. Given that keeping costs low is imperative for freighter operators, the Canadian Airports Authority believes that these extra costs may influence cargo operators to operate to or from the USA rather than Canada.

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2 Fifth freedom is the right to load freight in one country and then fly on to another country (e.g. on a flight from the UK to Hong Kong, a British carrier can pick up cargo in Amsterdam and take it on to Hong Kong.)
In the UK government policy effectively dictates which airports freighter operators can use in given markets, particularly the South East of England. The UK Airfreight Study Stage 2 gives the example of the Traffic Distribution Rules (TDRs) which restrict air traffic engaged on whole aeroplane cargo services from using Heathrow and Gatwick airports during times of peak congestion, except where the airport operator has provided explicit permission (DETR 2001). Heathrow is at 97% of its capacity in terms of slots and Gatwick is also heavily congested and therefore the airport operator (BAA) does not grant permission for new freighter flights. “Traffic Distribution Rules therefore discriminate against whole freight aircraft ...” (DETR 2001, p.48). Most freighter activity in the South East of England is therefore concentrated at Stansted Airport. The report however claims that TDR’s may threaten the security of freighter operators at Stansted if peak hour flying is needed for passenger operations (Stansted has a particularly large number of services from low cost carriers easyJet, Ryanair and Air Berlin). Airports that would otherwise be attractive to some freighter operators are therefore off bounds due to these policies. This restrictive regime is however allowing secondary airports to thrive in the cargo arena.

de Neufville and Odoni (2003) however believe that only the most severe and compelling government pressures can dictate the allocation of airlines and traffic between airports, believing the general rule to be that market dynamics ultimately prevail. They do identify that this is an issue though and offer some examples of successful government pressures that have affected the distribution of passenger airlines. One such case is the French government compelling Air France to move the majority of its operations from Paris Orly to Charles de Gaulle upon the latter’s opening. This caused substantial losses to the airline, which only survived due to its government ownership. More recently Los Angeles World Airports have begun initiatives to shift cargo services from Los Angeles International to Ontario, some 70 miles away (Putzger, 2003). They are encouraging operators of new services to use Ontario as space at LAX is restricted. Although the success of this is yet to be determined, such influences are being exerted on freighter operators.

Heathrow Airport still has a limited number of freighter services that were established when freighter slots at the airport were less restricted. The UK Airfreight Study Stage
2 (DETR, 2001) identifies yet another policy issue that discriminates against cargo. When it comes to slot allocation passenger operators who make use of their allocated slots one season can keep them for the next. This is part of the IATA policy of historical precedence or “grandfather rights”. This does not apply to freighter operators though. If it did the report claims that many freighter operators would have priority over a number of passenger operators at the airport when it came to slot allocation. This is a further example of freighter operators being given the lowest priority at the major airports.

2.4.4 Freight forwarders

Page (2003) believes there are important guidelines for airports to follow and the key requirement for airports is a deep knowledge of the cargo industry and the way airlines do business. “The successful airports look at how the airline looks at the market and who their customers are” (Page 2003, p.40). The freighter operators’ main customers are the freight forwarders and the influence of this sector on the airport choice of cargo airlines cannot be overlooked. Graham (1995) for example finds that “the industry tends to be controlled by the forwarders ... rather than by the airlines themselves” (p.30).

The president of MergeGlobal believes that airports don’t spend enough time understanding the forwarders and their importance to the whole air freight system. He believes that the most common mistake for airports is not to talk to forwarders (Page, 2003). According to MergeGlobal the top 15 freight forwarders in the world control 61% of international airfreight and the forwarders do not want to fragment their flow of freight and go to new places (Schwartz, 2002). It is therefore the traditional airports that have long served air cargo (e.g. London Heathrow, Frankfurt and Amsterdam) that the cargo airlines wish to operate to making it difficult for alternative airports to attract freighter services.

Conway (2004) highlights a prime example of this whereby Airbridge cargo began flying to Luxembourg but then shifted the majority of its European flights to Frankfurt due to the “power of all those Frankfurt forwarder facilities” (p.36).
Such is the feeling that freight forwarders hold the key to succeeding as a cargo airport, Amsterdam Airport’s business manager for cargo believes that any airport that can persuade Panalpina or Deutsche Post (two of the world’s largest freight forwarders) to establish operations at their location will have a significant advantage due to their ‘huge’ influence in concentrating traffic (Conway, 2004). The same source also believes that in a few years there will be 10 logistics companies worldwide dominating air freight and that to attract airlines it will be “crucial to have them at your airport” (p.37).

2.4.5 Airport marketing

Most of the airports that are interested in attracting cargo traffic spend a significant amount of time, effort and money on developing their cargo businesses. The literature has already identified a number of factors that can potentially influence a freighter operator’s choice of airport, and other sources suggest that airports that wish to, may also have a degree of influence on the airport choice of freighter operators, although the extent of this influence is uncertain.

For airports wishing to serve air cargo, it is important that they aggressively position themselves to serve the global market instead of assuming it will come to them (CAC 2000) and some airports do actively encourage freighter aircraft to their runways. Taylor (1998, p.27) commenting on the success of Nottingham East Midlands Airport in attracting freighter traffic for example, comments that the airport’s success can be attributed to the fact that ‘it has long accorded a priority to freight operations’.

Lee and Yang (2003) looked at the potential of Incheon International Airport near Seoul, South Korea as a logistics hub and identified three “success factors” for airports to become logistics hubs. These were:

- Infrastructure offering good inter-connectivity of transport modes and integrated logistics facilities on par with global standards;
- Government policies and regulations – including customs policies - should afford convenience and satisfaction for the users of services and facilities at the hub;
- Intensive competitive strategies and aggressive marketing strategies would need to be adopted in the running of the hub.

They believe that if these conditions are present airports will be in a good position to attract airlines. The first two points confirm what has been explored elsewhere in this chapter. The final point is significant here in that it suggests that airports can exercise real influence to attract freighter operators to their airport.

Page (2003) finds that marketing needs differ according to the type of airport. Cited within this reference, Jim Friedel president of Northwest Airlines Cargo explains how they divide airports into three tiers, where the top tier airports such as London and New York will always get a large share of the business. However he explains that second and third tier airports have to be more proactive in marketing terms, giving the carriers in-depth studies to make a business case for the airport and working closely with the carrier on a range of operating concerns once services begin. This demonstrates from an airline perspective that marketing is most important in terms of their decision when dealing with these secondary airports.

Calgary airport, whilst a major airport in Canada is one such airport that felt it needed to use aggressive marketing in order to attract any cargo airlines and is now viewed as an example of best practice in this regard (Jones, 2004). In 2001 the airport initiated a five year cargo plan, integrated into the airport master plan. The airport targeted freighter operators serving specific markets, initially seeking a European service and succeeded when they persuaded Cargolux to serve the airport. The airport has more recently secured services to Seoul from Korean Air and Asiana. This came about after two or three years of negotiations and a battle with the Canadian government over traffic rights, which the airport fought on behalf of the carriers. The airport cargo development director does not feel it is difficult to do an outstanding job in cargo and attract airlines. Why? Because “most airports are so bad at it – they just don’t pay attention to cargo the way they should” (Jones, 2004, p.14).
One way for airports to increase their attractiveness to freighter operators is to specialise in a particular 'niche area'. Vitoria Airport in Spain for example exploits demand for fresh fish by offering fast clearance times and specialist handling. Cargo airlines on their way back from Africa therefore choose to stop at the airport rather than the more centrally located Madrid as they are specifically geared for this type of traffic (Conway, 2002b).

There is a dearth of literature on the effectiveness of airport marketing on cargo airline choice. For passenger airlines though Graham (2001) believes airports that provide marketing assistance, not only in terms of pricing incentives but particularly with the funding of activities such as market research and promotional campaigns, will increase their chances of attracting airlines. Humphreys (1994) on the other hand questions the degree of marketing influence finding that “no matter how effective the airport's marketing strategy and no matter how persuasive the case for an airline to start a new service may be, the airline's decision-makers have the final say on the operation of a new route, and their decision may be influenced by factors outside the airport's control” (P.55).

2.4.6 Other Airlines

With freighter operators increasingly being squeezed out of major airports by environmental restrictions and legislation it seems one alternative is to operate from secondary or all cargo airports. The Air France vice-president for operations and logistics believes however it is unfeasible to locate all freighter activity at an all cargo airport as many carriers need to interline between belly hold (passenger) and freighter routes (Conway, 2002b).

A survey by Hall (2002) of cargo airlines operating from Los Angeles (LAX) found that for carriers who were also involved in passenger operations at the airport it was difficult to operate the freighter flights anywhere else, stating that "passengers and freight are interdependent in international travel" (Hall 2002, p.32). He explains LAX's popularity with cargo airlines as being a function of its popularity with passenger airlines. As over 48% of international air cargo is carried in the belly hold
of passenger aircraft (Airbus 2004) there are certain amounts of efficiency gains to be made in terms of intralining and interlining for passenger and cargo aircraft to share the same airport.

This is confirmed by Caves et al. (1985) who note that the combination carriers used to seek a policy of locating cargo at separate airports from their passenger operations before the advent of the wide body passenger aircraft with an abundance of belly hold space. They describe how this has now come full circle, with the carriers wishing to consolidate at one airport, although often due to congestion being forced to use alternative locations.

Hahn, outside of Frankfurt is a counter argument to the belief that major combination carriers prefer or need to congregate at the major hubs (Rowe, 2005b). The airport handled 66,000 tonnes of cargo in 2004 in addition to 191,000 tonnes of road-feeder airfreight, following the development by Air France of a road feeder hub. British Airways world cargo operates 4 weekly 747 freighters, whilst Aeroflot operates 14 freighters a week through the airport. Rowe (2005b) finds that part of the reason for this is that the airport has concentrated on road freight as well as air freight and created the same ties between road and air freight as exist between passenger and cargo flights.

de Neufville and Odoni (2003) add a further dimension to the issue of airport location suggesting that passenger airlines concentrate their activities to avoid giving their competitors a decisive advantage in the marketplace, deploying their aircraft as strategically as they can. The goal of all airlines (passenger and cargo) is to obtain the largest and most profitable share of the market. In competing markets a firm's attempt to gain an edge will often lead them both to a competitively stable position i.e. concentration of flights at the primary airport in any multi-airport system. This can explain the observed pattern of concentration of traffic at primary airports e.g. many overseas cargo operators base their European operations at Amsterdam. This strikes parallels with the Hotelling model in location theory with the actions (or potential actions) of a competitor leading two companies to locate side by side in the central location (see chapter 3, section 3.3).
Ohashi et al. (2005) further identify how existing carriers at an airport are attractive to potential operators, finding that they act as a proxy for the size of hinterland demand and serve as a good indicator for the potential of the airport and region.

New cargo services at Calgary airport in 2004 demonstrate the importance competition can have on airport and route selection. As Putzger (2004) states, freighter operator Cargojet moved in to serve Calgary airport after Air Canada replaced cargo-friendly widebody passenger aircraft with narrowbody aircraft on routes from the airport to major Canadian cities. Sensing an opportunity Cargojet introduced a freighter service from Calgary to Vancouver to pick up the cargo Air Canada were unable to carry on their smaller passenger aircraft. Air Canada (not a freighter operator) then responded and began freighter services of their own using leased aircraft—widely speculated to be a reactive move.

For non-integrated carriers Michael Webber, President of US consultancy Webber Air Cargo, finds that US airports cannot expect to succeed with international air cargo if they first can't persuade FedEx and UPS to operate regional services there, given the sheer scale and range of their operations in the US and the 'prestige' that having such carriers provides in a marketing sense (Rowe, 2005b).

2.4.7 The behavioural variable

With the myriad of measured variables identified in this chapter, there are still decisions taken by airline executives that are based on instinct or personal preference, regardless of many of these other factors. As Lösch (1954, p.224) found, "the mathematical determination of the optimum transport point is a ... less accurate (a solution to the location problem) than the statement that an entrepreneur will establish his enterprise at a place that he likes best".

As this research is focused on actual decision-making it is possible that factors based on less scientific foundations can lead to the marriage of a particular airport with a particular freighter operator. It is important that the context within which the choice is made must be considered (D'Este, 1992) and it should be understood that it
encompasses past, current and future implications in both the transport and wider organisational context (Pedersen and Gray, 1998).

Black (1993) highlights that historic decisions often play a critical role in locating transport routes. In the context of this thesis this may refer to an historical association between an airline and an airport from previous operations or from current passenger operations. One such example widely quoted within the industry is that of Malaysia Airline System's (MAS) decision to move its European airport for freighter flights from Amsterdam to Hahn (Germany) in 2000. Conway (2002a) relays that the cargo manager at MAS at the time was a German who had previously been involved in the construction of the new cargo terminal at Hahn and was keen for it to have an occupier. Management biases and airline politics were also touted as a reason why the service eventually returned to Amsterdam after a management change at the carrier. It is believed the carrier wanted to work more closely with its cargo partner KLM and a move to Amsterdam allowed this to happen.

2.4.8 Third Party Influences Literature Summary

- Many freighter Operators need airports that permit operations 24 hours per day;
- Airlines with nosier aircraft need a relaxed approach to the issue of noise from an airport;
- Bilaterals and official policy can severely restrict airport choice;
- Historic decisions can influence future ones, as may company politics;
- Scheduled operators with passenger operations may wish to consolidate both of these at a main passenger hub;
- Individual “behavioural” decisions can override many other factors.
- Airports that know the market and offer the facilities and services freighter operators require are more likely to succeed in attracting cargo airlines;
- Freight forwarders attract cargo airlines and airports should look to work closely with them;
- The development of a niche can attract certain carriers;
- Airport marketing can have an influence on freighter operators airport choice.
2.5 Chapter summary

This chapter has reviewed published literature in the area of airport choice and identified a number of key factors that influence freighter operators in their choice of airport. The Vice President of Korean Air's Incheon cargo traffic office describes an ideal freighter airport as one which "...offers around the-clock operation, spacious ramps and aircraft parking, effortless transfer between the aircraft parking lot and warehouse, easy access to customers logistics centres and a strategic and geographical location easily accessible to its prime market" (Schwartz 2002, p.66). This summarises the findings from this chapter, although such airports, free from restrictions are few and far between, suggesting that cargo airlines often demonstrate 'satisficing' behaviour, where decision makers accept the option that is good enough rather than the optimum solution (Simon 1976).

The three categories of location, airport quality and external factors that emerged from the literature suggest a generic process that freighter operators work through when selecting an airport that is deemed worthy of further exploration. The factors that make up the three stages are summarised in table 2.3.

A distinction is made in table 2.3 between integrated carriers and the focus for the remainder of this research, non-integrated carriers and there are seemingly many differences between the two types of carriers regarding their airport selection practices. The literature suggests for example that a non-integrated carrier would be better suited to an established 'gateway' airport, which will not only have a concentration of freight forwarders but also allow consolidation with passenger services, whereas an integrated carrier would not need to make use of these and would possibly look instead at a secondary, uncongested airport with capacity for further expansion.

There are also a number of key differences highlighted in this chapter between the location of a hub operation and the location of a single point-to-point service. For example a central geographical location is more desirable for hub operations to allow other airports to be easily fed by air and road, whilst an airport closer to the market served was found to be more important for point-to-point operations.
Chapter 2 - Literary Background

Stage 1: Identify a general location to serve

- Identify a market to be served by the airline
- Must have a strong demand for cargo services
- Or be stipulated by a customer with a base load
- Or be centrally located to operate as a hub
- Do Bilaterals restrict operations at a regional level?

Stage 2: Look at the barriers to operation

- Sufficient capacity for operation?
- Are there noise restrictions (for older aircraft)?
- Can aircraft be operated into the airport at night?
- Any Traffic Distribution rules in force at the airport?
- Do Bilaterals restrict ops at specific airports?
- Is the runway infrastructure adequate for planned operations?

Stage 3: Assess airports on individual merits

- Weather record of the airport
- Is a long term investment viable?
- Space to build dedicated facilities?
- Airport user charges
- Availability and cost of labour
- Convenient road access and are intermodal facilities available?
- Is the average delay per aircraft movement figure acceptable?
- Are customs clearance times acceptable?

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<tr>
<th>Integrated</th>
<th>Non-Integrated</th>
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<tr>
<td>Close proximity to freight forwarders?</td>
<td>Can passenger belly cargo be consolidated?</td>
</tr>
<tr>
<td>Required handling equipment/Terminal</td>
<td></td>
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<tr>
<td>Space to build dedicated facilities?</td>
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<tr>
<td>Any Traffic Distribution rules in force at the airport?</td>
<td>Airport user charges</td>
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<td>Availability and cost of labour</td>
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<td>Convenient road access and are intermodal facilities available?</td>
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<td>Are customs clearance times acceptable?</td>
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Table 2.3: The three stages of the airport choice decision of freighter operators and the factors considered in each stage.

What these differences show is that the body of research related to integrator and hub locations has limitations in terms of accurately explaining why non-integrated carriers choose particular airports. This chapter has confirmed that there is a dearth of literature in this area and demonstrates the real need for the research at the core of this thesis. The most significant issues raised from this chapter will contribute to the direction of the research method by ensuring that it is focused on the key issues raised. Furthermore the issues raised by the following chapter examining location theory relevant to this research, will contribute in the same way.

An abridged version of this chapter has been published in Transport Reviews (see Gardiner et al., 2005a).
3. A Theoretical Perspective on Location

3.1 Introduction

"Economic activities rarely occur in predetermined places, but they are generally subject to location choice." (Beckman, 1968)

The literature chapter highlighted a broad array of factors from mostly aviation-specific references in order to provide an informed basis for the development of research propositions and the methodology as described in subsequent chapters. During the detailed literature search a number of references were made to a variety of location theories with the suggestion that these may explain in part the locational behaviour of non-integrated freighter operators. Therefore this chapter sets out to explore these theories and aims to gain a deeper understanding of the underlying reasons for certain locations being chosen. The primary purpose of this chapter though is to further assist in the development of research propositions which will feed into the design of the empirical methods and ultimately measure the suitability of the theoretical explanation adopted in the discussion chapter with regards to the locations of non-integrated freighter operators.

As highlighted in chapter 2, each time a freighter operator seeks to add a route to its network a location decision has to be made. In particular a decision is made as to which airports will be used at either end of the route. These decisions are of a multifarious nature, taking many aspects into consideration. Among them are factors that have a grounding in one of the many location theories which seek to explain the basic, universal factors that determine and influence the location of all kinds of economic activity.

Location theory is a diverse subject and these theories range from the classical work of Von Thünen to the contemporary work of Porter with his theories on competitive advantage, particularly through the clustering of firms. There are two broad types of location theory - that relating to spatial aspects and that relating to behavioural aspects (Cox and Golledge, 1981). It is sometimes helpful to make a superficial distinction
between the spatial and the behavioural axioms of location theory. The former postulates the properties of the area over which the actions occur, whilst the latter concerns the motives and behaviour attributed to the actors themselves and it is here where the interests of this research fall.

Whilst many of the classical theories focus on the location of manufacturing which can only bear a fragile relevance to the modern, dynamic service industry in which cargo airlines operate, there are "behavioural" theories of location that particularly focus on interactions between various industry players such as agglomeration theory and Porter's work on clusters, as well as theories exploring the impact of competitors on location such as Hotelling's duopoly model, which offer a more significant explanation of the observed locations of freighter operators.

Of particular interest are the linkages between the air cargo activities of an airline and those of competing airlines and related support services such as handling agents and freight forwarders, all of which were found to be of influence in the literature chapter. In addition to the magnetic effect that clusters of aviation activity may have for attracting a freighter operator to a particular airport, clusters of economic activity external to the aviation industry but which rely on it for the movement of goods e.g. Silicon Valley, are also a powerful force in attracting a freighter service to a region, although in the case of a multi-airport region, not necessarily to a particular airport.

This chapter therefore focuses on Weber's theory of agglomeration with reference to the present research, as well as Hotelling's duopoly model and also evaluates the influence of Porter's work on clusters which links these previous two theories together. Clusters are evaluated from both the regional demand perspective and also from the perspective of the development of airport cities through clustering around the airport hub.

3.2 Location theory: a brief history

The theories described in this chapter have their origins in classical location theory developed over a period of almost two centuries. An understanding of some of the
core classic theories is important in order to provide an insight into the theory underpinning freighter operators' location decisions and to potentially inform the research.

The first industrial location theory was developed by Von Thunen in 1826 in a study of agricultural land use around an urban centre. Briefly stated the theory states that each parcel of land will be used by the activity that bids the highest price and that the price that a potential user can bid at a given location depends largely on the distance, as expressed by transport or commuting cost, from the central city (Harris and Hopkins, 1972). Using the Von Thunen model potential locations are ranked and chosen in order of least transportation cost — a theme developed in subsequent studies by location theorists.

Alfred Weber (1929) for example developed a least cost theory of location. Weber's concern was to identify the optimal location for an individual firm. Based on a set of assumptions such as believing the manufacturer could sell all he produced regardless of his location and assuming demand was constant in both quantity and location, he envisaged the location of industry as being determined by primary factors (e.g. transport and labour costs) and secondary factors (e.g. forces of agglomeration).

Weber viewed agglomeration as the monetary savings per unit that would accrue to a plant from locating within a cluster of other plants (Wheeler et al., 1998). By choosing locations close to competitors or to external services, new producers minimise the risks involved in starting up. Such risks will be greatest for small firms and will be higher as the distance from their markets increases. Weber's agglomeration theory, whilst described by Dicken and Lloyd (1990) as one of the weaker aspects of his work, nevertheless introduced a significant concept in respect of this thesis — that of firms being influenced by the locations of others.

Lösch (1954) enhanced Weber's earlier theory by introducing the demand factor where the quantity demanded was seen to be influenced by the distance of the consumer from the production site. The fusion of Lösch's theory with that of Weber demonstrated that the location decision was profit motivated. Lösch would rank
locations not by least cost but by maximum profits where total revenue exceeds total costs by the greatest amount (Smith, 1981).

In 1929 Hotelling developed the concept that location decisions are not made independently but are influenced by the actions of others, with his linear market duopoly model. He talks of "an undue tendency for competitors to imitate each other in quality of goods, in location, and in other essential ways" (Hotelling, 1929, p. 41).

With Hotelling's model an attempt is made to establish the profit-maximising locations for two producers selling an identical product in circumstances where consumers are evenly distributed and one unit of output is purchased by each consumer in any given time period. Within this framework the two producers will jostle for the best location until the stage is reached when they are both located at the centre of the market. At the shared location each producer will not be able to increase profits by relocation and their prices will be the same in order to ensure their share of the market. The concept of a firm's location being influenced by other firms is a theme emanating through the literature chapter and therefore Hotelling's theory is described in further detail in section 3.3 of this chapter.

Central Place Theory is a theory advanced by Christaller (1933) and later Lösch (1954), concerned with the way that settlements evolve and are spaced out. It explains patterns of urbanisation and establishment of market areas for different goods and services. Crucially it specifically recognizes that no community's trade sector can be viewed in isolation, an important concept in the subsequent discussion in this chapter.

Lösch's modification to Christaller's work analyses the market areas of firms under monopolistic competition and considers the locational system of firms or cities. As long as a firm earns a profit greater than that obtained when operating from the small market area it will only locate at the central place, although the activities of other firms also has a role in Lösch's theory (Ishikawa and Toda, 2000).

More contemporary theories have moved away from the obsession with transport costs of the earlier theories with a greater emphasis on behavioural factors. Among
the first of these was Pred (1972) with his behavioural matrix. The behavioural matrix was put forward as a device to assist in understanding real world deviations from location patterns produced by the spatial models of the early location theories (Smith, 1981). The behavioural matrix is a useful way of conceptualising the effect of imperfections in the ability of entrepreneurs and the information available to them, but as Pred concedes it is merely a verbal formalization of the fairly obvious. Pred's behavioural matrix is an important concept for a number of reasons. As far as the study of industrial location is concerned, it emphasized that decisions are taken by individuals and organizations that diverge, to varying extents from the theoretical norm of economic man (Chapman and Walker, 1991).

Some of the theories described above, such as Weber's agglomeration theory and Hotelling's linear market duopoly model have been extended and adapted in more modern works that bear greater relevance to the current research. One primary example is Porter's work focusing on clusters which effectively marries the two theories mentioned above. Porter (1998b, p.199) describes clusters as "a geographically proximate group of interconnected companies and associated institutions in a particular field, linked by commonalities and complementaries ..." and finds that "the geographic scope of a cluster can range from a single city or state to a country or even a network of neighbouring countries".

With this work on clusters location theory has in many ways come full circle, focusing in ever-increasing detail on the agglomeration of firms but taking the original work of Weber to a new level. No longer is this solely about location theory but it encompasses theory of the competition between firms, as introduced by Hotelling, which as the literature chapter suggests is a consideration for freighter operators when choosing airports. Indeed Porter approaches the subject distinctly from a business strategy perspective, an approach more sympathetic to the nature of this research. Clusters are therefore discussed in further detail in this chapter.

Whilst many of the methods of the "classic" location theories may have become outdated in the 21st century and may not fully represent the processes and decisions of freighter operators when choosing an airport location, their principles are as relevant
as they ever were, and it is important to recognise the origins of the theories discussed below.

3.3 Hotelling and the locational influence of competitors

One of the key themes identified from the literature chapter was the external influences on freighter operators’ choice of airport and this is therefore a key theme for this chapter. As Daniels (1993) states, the location of any industry cannot be considered in isolation and its success may be closely related to the locational decisions of others. One of the first theories to indicate that location decisions are not made independently was Hotelling’s linear market duopoly model, which examines the impact of competition on location in a duopoly.

Hotelling’s model has two stages: first the firms choose locations, then they compete on price. For this thesis the primary focus is on the location choice element of the theory. The Hotelling model is focused on two competitors who confront a linear-bounded market. It is assumed that production costs are zero for each locational unit, identical buyers are evenly distributed over this market, and their demand for the good in question is not sensitive to price differences (i.e. the elasticity of demand is zero). The assumption is that one unit of the good is consumed by each individual per period of time, and each buyer prefers to purchase from the nearest seller (Hoover and Giarratani, 1999).

This situation is depicted in Figure 3.1. In panel (a), the linear market is segmented into two uncontested parts, a and b, and one contested part, x + y, that is shared equally by the sellers (Hoover and Giarratani, 1999). The two sellers, A and B, can move to any location on the line that will maximize their profit, and they do so believing that the rival will not change its location in response to their actions.
In the restricted environment established by these assumptions, profits are always enhanced if a seller increases its market area. Since production is costless, larger market areas imply greater sales and, therefore, greater profits.

If each seller believed that the other's location was fixed, the first seller to act, say A, would move to a position adjacent to its rival, ensuring itself the largest possible market area. If the initial positions are as depicted in panel (a), the first seller to move would seek to eliminate the contested portion of the market and maximize its protected portion, as represented in panel (b). The second seller is similarly motivated however, and would leapfrog its rival to obtain competitive advantage. This type of movement would continue until neither seller stood to gain from further action. Such a situation would prevail if both sellers assumed central locations as in panel (c), with each sharing half of the market\(^1\). Hotelling's conclusion was that the firms locate close to each other and products are minimally differentiated. This affirms his belief that in a general class of cases the independent actions of two competitors not in collusion lead to a type of equilibrium (Hotelling, 1929).

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1 The classic demonstration of this model is based on two ice-cream salesmen, A and B, on a mile of beach. The cost and choice of ice cream is the same for each distributor. Buyers are evenly distributed along the beach. The first pattern of market share has the two salesmen positioned so that each is at the centre of his half of the beach and the market is split up evenly. If A now moves nearer to the middle of the beach, he will increase his market share. The logical outcome of this will have both salesmen back to back at the centre of the beach.
Chapter 3 - A Theoretical Perspective on Location

The theories described in subsequent sections will provide alternative views as to the impact on location of other firms, but from the Hotelling model it can be surmised that locations central to the market are preferred where there is more than one firm operating so as to prevent competitors from capturing a disproportionately large share of the market. As freighter operators are not as footloose as the firms in Hotelling's model, locating at a central point may take on even more importance.

3.4 An introduction to agglomeration theory

"Agglomeration economies become yet another element contributing to the ... decision to locate and therefore have a significant impact on the location of economic activity" (Dicken and Lloyd, 1990).

One of the emerging themes of this research is the interaction between freighter operators and other firms, be they the airport company, freight forwarders, handling agents, or other freighter operators, and particularly the influence, either deliberate or unintentional, that they may have on freighter operators' location decisions. The discussion of Hotelling's theory in section 3.3 indicated the potential locational impact of direct competitors which may have the effect of bringing firms together in a single location. This section looks at a different route for obtaining the same outcome, this time through the economies of agglomeration.

Agglomeration theory and its more contemporary descendents, which have transcended pure economic geography and moved the subject more into the sphere of business strategy, are therefore an appropriate place to focus this discussion. Following the lead of Malmberg and Maskell (2001), industry agglomeration and spatial clustering are used synonymously to denote the phenomenon that similar or related firms and industries tend to assemble (concentrate, agglomerate, co-locate, cluster) in particular places.

A basic definition of agglomeration economies is provided by Wheeler et al. (1998) who describe them as those savings that result from concentrating economic activities in one place or adjacent to one another. One of the earliest proponents of the benefits
the concept of spatial clustering of companies can bring was Weber in his seminal (1929) work, 'Theory of the location of industries'. Weber saw agglomeration as not producing internal-scale economies but rather external economies.

There are a number of examples such as large out of town shopping centres where economies are to be gained from locating alongside supporting industries or direct competitors. Dicken (1998) argues that today spatial clustering is the single most important factor in helping to explain the geography of economic activity. Wheeler et al. (1998) even believe that Weber underestimated the effect of agglomeration on location decisions.

A distinction is commonly made between two types of agglomeration economy (Nourse, 1968; Dicken and Lloyd, 1990; Malmberg and Maskell, 2001) that may help to explain the observed patterns of location of the world's non-integrated freighter operators.

One of these is related to the phenomenon that economic activity in general tends to concentrate in cities or industrial core regions. The advantages gained by such behaviour are often referred to as urbanisation economies. The other is related to the phenomenon that firms within the same or closely related industries tend to gather at certain places. Those mechanisms leading to such behaviour are correspondingly referred to as localisation economies.

Both of these types of economy have a different role in explaining location. Urbanisation economies are the driving force behind industrial clusters, perhaps the most profound example of which is Silicon Valley in California (Porter, 1998a). This is important because as Henderson et al. (2001) state, firms typically want to locate close to demand. Clusters are discussed further in section 3.5 below. Localisation economies on the other hand explain more how firms come to be located at the exact location within a region that they are observed and this notion is developed in section 3.6.
3.5 Urbanisation economies and local clusters

Urbanisation economies – the advantages gained from the concentration of economic activity in cities or core regions - are an area of agglomeration theory that have received much attention during the 1990s and subsequent years, principally from business strategists such as Porter with his research into cluster formation. As Porter (1998c, p.90) states: "in a global economy – which boasts rapid transportation, high-speed communication, and accessible markets – one would expect location to diminish in importance. But the opposite is true. The enduring competitive advantages in a global economy are often heavily local, arising from concentrations of ... related businesses".

The primary difference between urbanisation and localisation economies is that the latter are gained by firms in a single industry at a single location (e.g. an airport), while urbanisation economies apply to all firms in all industries in a region and reflect external economies passed to enterprises as a result of savings from the large-scale operation of the agglomeration as a whole (Dicken and Lloyd, 1990).

Porter (1998a, p.78) describes clusters as a “new way of thinking about location”. Martin and Sunley (2003) however describe the conflicting messages studies on clusters have produced, particularly when it comes to defining the scale of a cluster. Some for example describe clusters as cities whilst others more specifically state that the proximity inherent in a cluster extends up to a range of 50 miles, whilst Crouch and Farrell (2001, p.163) paint a more general picture of clusters, describing “a tendency for firms in similar types of business to locate close together, though without having a particularly important presence in an area”.

In order to provide a clearer picture of what constitutes a cluster, the UK Department of the Environment Transport and the Regions (DETR, 2000, p.9) define five general characteristics of a cluster in their cluster planning document:

2 The transportation arm of the DETR now comes under the jurisdiction of the Department for Transport (DfT).
Innovation and shared demand for facilities and services designed to foster innovation.
- Exchange of information and ideas with related businesses. Businesses within clusters and operating in the same markets can also be very competitive.
- Proximity to suppliers and supporting firms (helps reduce costs and foster closer collaboration).
- Access to a pool of specialist labour.
- Proximity of infrastructure of benefit to most businesses in the cluster (e.g. airports).

What is important is that clusters are an economic force and one that the air cargo industry is involved in by facilitating trade between global clusters, at a level that is mutually beneficial, and it is particularly significant that the DETR mention proximity to airports as an important characteristic of a cluster. As Porter (1998b) identifies, a relatively small number of clusters usually account for a major share of the economy within a geographic area as well as an overwhelming share of the outward orientated economic activity (e.g. exports), and therefore access to air cargo links is vital for such clusters.

The link between service industries such as air transport and manufacturing industries which are typically at the heart of clusters, is acknowledged by Porter (1998c) who finds that service industries are an integral part of clusters and help spawn or upgrade supplier and buyer industries whilst crucially finding that competitive manufacturing industries stimulate international success in linked services. Porter (1998b) further finds that without local manufacturing firms the demand for services is limited and although service firms also buy services, many service industries depend on manufacturing firms for a significant share of their sales. This demonstrates why clusters act as a magnet for air cargo activity and how important they are, particularly as Porter claims that without local manufacturing firms the demand for services is limited as many service industries are dependent on manufacturing firms for a significant share of their business.

It is important to note that clustering is a business strategy as well as an observed locational pattern. Porter for example is less interested in analysing past behaviour, as
with many classical theories, and is more concerned with how things can be improved in the future. Viewing a group of companies and institutions as a cluster highlights opportunities for coordination and mutual improvement in areas of common concern without threatening or distorting competition or limiting the intensity of rivalry (Porter 1998b). What agglomeration theory tells us and clusters in particular reveal is that what happens inside companies is important, but the immediate business environment outside companies plays a vital role as well and it is this thinking that is leading firms to take a strategy of locating within clusters. For example, Porter (1998a) finds that clusters often make it easier to measure and compare performances because local rivals share general circumstances. Until relatively recently this role of locations has long been overlooked, despite striking evidence that innovation and competitive success in so many fields are geographically concentrated (Porter, 1998a).

In terms of choosing cluster locations, cluster theory suggests that locational choices should weigh overall productivity potential, not just input costs or taxes. In locating activities the aim is low total costs. Locations with low wages and low taxes however often lack sufficient infrastructure, available suppliers, timely maintenance, and other conditions that clusters offer (Porter, 1998b). Yet the effects of low wages, low taxes and low utility costs are very attractive to firms as they are easy to measure 'up front', while productivity costs remain hidden and unanticipated.

A cluster can be classed as a system of companies whose value as a whole is greater than the sum of its parts and the air cargo industry is likely to benefit from groups of linked activities being in the same place than spread across numerous locations. Having established that urbanisation economies attract transportation linkages such as airlines into a particular region with a strong economic cluster, an examination of localisation economies will now propose that freighter operators are attracted to particular airport locations based on localisation economies.
3.6 Localisation economies

Localisation economies are benefits derived by firms in a particular industry from locating close to each other, and in the context of this research are more closely allied with the more traditional facets of agglomeration theory.

In terms of the development of clusters from a localisation perspective though, Porter (2004) finds that “anchor” companies play a disproportionate role in seeding cluster development. Anchor companies tend to be the dominant firms within a cluster or are firms which heavily rely on the support of complementary businesses and therefore support cluster development by acting as magnets for other major companies; organising other companies in the cluster for collective action – all activities which strengthen key elements of the cluster.

Wheeler et al. (1998) state that in order to gain a competitive edge in the midst of changing industry structures, many location decisions must be viewed as part of an interdependent process, as firms have become sensitive to the location of other firms that provide both primary and support activities. Dicken and Lloyd (1990) confirm the view that an important basis of agglomeration economies is the connections or linkages between economic activities within a relatively restricted geographic area. These linkages are of three main types: production linkages, service linkages and marketing linkages (Dicken and Lloyd, 1990). An agglomeration economy may exist therefore where some or all of these linkages are present within a relatively small geographic area thus either lowering a firm’s costs or increasing its revenue.

Head et al. (1995) attempt to highlight some empirical evidence of agglomeration with regards to the location choices of 751 Japanese manufacturing plants in the United States since 1980. They find that agglomeration effects are very significant statistically and conditional logit estimates support their hypothesis that industry level agglomeration benefits play an important role in location decisions by increasing the attractiveness of a location.
Weber (1929) stresses cost savings through economies of scale\(^3\) as the main advantages of agglomeration. These cost reductions may be internal economies of scale, gained within a single firm, or external economies of scale achieved by the agglomeration of many different firms in a particular location. However achieved Berry et al. (1997) believe that economies of scale are important to the survival of firms and essential to achieving a competitive edge.

Many other treatments of agglomeration economics stress cost minimisation due to proximity to inputs or proximity to markets too (Porter, 1998a). However, whilst cost saving is still typically a benefit, it can be argued that it is not the main benefit. Porter’s cluster theory suggests for example that locational choices should weigh overall productivity potential, and not just input costs, particularly as the cost element has been undercut by the globalisation of markets, technology, and supply sources (Porter 1998a).

There are however further localisation economies to be gained from agglomeration, particularly from being located in close proximity to competitors. As well as the cost savings and increased business that agglomeration may bring due to scale, Webber (1984) identifies economies of information as another benefit associated with agglomerations. Businesses can communicate with related firms more effectively if they are located close by, helping to develop relationships. Marketing provides another form of complementary within clusters. The presence of a group of related firms and industries in a location offers efficiencies in joint marketing, for example trade fairs, trade magazines, and marketing delegations (Porter, 1998c).

One advantage of agglomeration for firms is the reduction of uncertainty and risk involved in starting up (Daniels, 1985; Dicken and Lloyd, 1990). As Daniels (1993) observes, trading in international markets introduces great uncertainty because of factors such as cultural differences, local regulatory requirements and the time necessary to establish a client base. “Careful and conservative location decisions, perhaps modelled on the behaviour of competitors is one way to minimise the uncertainty of expanding into new environments” (Daniels, 1993, p.113). For

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\(^3\) Economies of scale are the reductions in unit costs that result from an increased level of output.
example if a number of competing firms are clustered in a particular location and are surviving and thriving, other operators may observe this and conclude that conditions must therefore be satisfactory for them, as opposed to an untried location which carries an element of risk. This point in particular links this theory with that of Hotelling.

A further benefit derived from agglomeration is the creation of a pooled market for workers with specialised skills (Head et al., 1995). This is particularly true of localised agglomeration with many firms in the same industry requiring similar skills located together. Weber (1929) also recognized the influence of labour costs and the possibility that economies may be achieved as a result of the agglomeration of several related firms in close proximity to one another. Because of the importance of labour, Porter (1998a) finds that in a globalised market with efficient transportation and communication, many companies have been led to move some or all of their operations to locations with low wages, taxes and utility costs, although he counter-argues that location decisions must be based on both total systems costs and innovation potential, and not on input costs alone.

Table 3.1 summarises the main localisation economics that may benefit firms clustering at a single location with a critical mass of competing or complementary companies. The information in the table has been compiled from the various references on the subject of agglomeration sourced in this chapter. The first column highlights the actual benefit in terms of localisation economies that a firm may gain. These benefits are both financial in the case of cost savings and from increased business, and also strategic, in terms of allowing better information sharing and enhanced performance measurement. The second column indicates the catalyst for these benefits, in terms of what action a firm will take to avail of the aforementioned benefits, whilst the third column explains the link between the catalyst and the benefit.
Agglomeration may also create diseconomies however (Dicken and Lloyd, 1990). Beyond a certain scale disadvantages of spatial clustering may appear and there may be a point where an agglomeration becomes incapable of maintaining its efficiency. Problems such as congestion, clogged transportation arteries, soaring land prices and pollution begin to transform urbanisation economies into diseconomies. This is an important point and a developing theme in a number of industries at the moment, air transport being one of them.

Agglomeration theory explains that there are advantages from locating close to other firms but does not explain in any detail how this comes about. Head et al. (1995) for example identify that the cumulative location choices that constitute the process of agglomeration allow accidents of history to influence the long run geographical pattern of industry. Malmberg and Maskell (2001) state that from reading the vast literature on agglomeration that there is a risk of ending up with models of circular causation: When the cluster-generating economic mechanisms cannot be observed, their existence is “proven” merely with reference to the existence of the cluster. This

<table>
<thead>
<tr>
<th>Benefit</th>
<th>Catalyst</th>
<th>Explanation</th>
</tr>
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<tbody>
<tr>
<td>Cost savings</td>
<td>Scale economies from suppliers</td>
<td>By supplying a large number of firms suppliers may pass on their savings from scale economies</td>
</tr>
<tr>
<td>Increased business</td>
<td>Locating in proximity to customers</td>
<td>Customers may choose to give “local” firms more business, depending on rates</td>
</tr>
<tr>
<td>Maintain / extend market share</td>
<td>Locating with competitors</td>
<td>Prevents competitors from dominating the market from the best location</td>
</tr>
<tr>
<td>Better information sharing</td>
<td>Locating in close proximity to related firms</td>
<td>Provides opportunity to discuss and take action on issues affecting the entire cluster of related firms through mediums such as local associations</td>
</tr>
<tr>
<td>Enhanced performance measurement and comparison</td>
<td>Locating in close proximity to rival firms</td>
<td>It is easier to measure and compare performances because local rivals share general circumstances</td>
</tr>
<tr>
<td>Reduction of uncertainty</td>
<td>The experiences of other firms</td>
<td>A cluster of firms at a single location suggests a new entrant can survive</td>
</tr>
</tbody>
</table>

Table 3.1: Potential localisation benefits for firms in a cluster.
can be said to be true of many major airports, some of which have been major economic forces for as long as there have been aircraft and have grown as clusters ever since, even though their initial prominence was often as a result of government decisions. This is because once a site has become a centre of activity then a "lock-in" effect operates (Henderson et al., 2001). Even if exogenous circumstances change economic agents will not want to move away and forego the benefits of the agglomeration. This tendency will be accentuated by the durability of sunk cost investments such as infrastructure which firms may have developed at some sites.

This "lock-in" effect is particularly pertinent to the development of the "aerotropolis" concept. Porter (2003) identifies transportation and logistics as one of many traded clusters and sub clusters. Within this cluster air, bus and marine transportation are identified along with their related terminals. Increasingly airports are acting as terminals for many modes of transportation as well as support services and even industries not directly related but that wish to make use of a convenient access location. As described below, the aerotropolis concept is a "super location" of aviation and non-aviation activity clustered around major airports.

3.7 The Aerotropolis: An amalgamation of the localisation and urbanisation economies of agglomeration.

A paradox with agglomeration theory is that transport costs have to be sufficiently low for firms to gather in regions. Collecting all the arguments together, Belleflamme et al. (2000) observe that firms must be able to serve almost equally all markets (globalisation) in order to enjoy the local advantages associated with the formation of a cluster (localisation). This suggests that a potential cluster region should have good air cargo links at the outset, whereas the alternative argument is that the demand is established before the air service commences to serve that demand. It is this that has led new research into a particular type of cluster: the airport city or "aerotropolis" where unbeatable transport links and an industrial cluster of firms develop together in the region surrounding an existing or new airport facility.
Recent academics led by Dr John Kasarda of the Kenan Institute of Private Enterprise, University of North Carolina have attempted to ascribe a new wave of regional development to the development of major airports, in the same way that railways led development in the 19th century and roads did in the 20th century. Kasarda et al. (2004) state that substantial evidence is accumulating that major airports are generating concentrations of commercial activities that are leading to a new, aviation-linked form – the aerotropolis. Just as towns first grew around seaports, then out of canals and waterways and later railroads and the highways, so it is argued now that airports represent the “fifth wave” of development with clusters of residential and business developments beginning to grow out of airport linkages.

This is particularly pertinent given that in order to gain competitive advantage through speedy global supply chain connectivity that air cargo provides, high-tech manufacturers and other time critical shippers are locating at sites around or accessible to major airports (Kasarda et al., 2004). This type of industrial development therefore increases the demand for cargo services at such airports. In the case of the aerotropolis, development can extend 10, even 20 miles or more away from the centre, incorporating additional development such as office and research parks, districts zoned for specific purposes, foreign trade zones, entertainment and conference facilities and even residential developments, as figure 3.2 demonstrates.
Kasarda et al. (2004) believe that the businesses identified in figure 3.2 deliberately locate around air cargo activity and that in turn this increases demand for cargo services. There are a number of emerging examples of aerotropoli and Arend et al. (2004) identify Dallas Fort Worth Airport as one of the clearest examples of an aerotropolis taking shape in the United States, following examples elsewhere such as Amsterdam Schiphol. Both of these locations have developed as a brand beyond the airport and as their respective areas develop, the brand is attracting new businesses.

The difference between this concept and that discussed under the heading of localisation economies is that the aerotropolis does not necessarily have to be developed around a major hub, nor is it based on historic coincidences of location. A number of aerotropolis concepts are being developed in the United States based around secondary industrial airports which do not currently have a critical mass of carriers. One such example is Ontario, California, which has little passenger traffic and even less non-integrated freighter traffic. What this airport does have though, as do other proposed aerotropoli is an integrator presence which suggests that it is these
carriers that are leading the development of such projects. Non-integrated carriers are likely to take a lesser role in developing such airports but are more likely to react once the development reaches a certain scale and demand for cargo increases as a result of the initial integrator investment.

### 3.8 Chapter summary

Following a brief overview of location theory and a more detailed discussion of Hotelling's linear market duopoly model, agglomeration and the related aerotropolis concept, this chapter has proposed that economies gained from agglomeration and spatial clustering have an impact on the location decisions of firms.

Two potential influences of agglomeration have been identified: those relating to urbanisation economies, in particular the spatial clustering of manufacturing firms which may impact on the market the operator chooses to serve; as well as localisation economies which may impact on the location of airlines at specific airports through clustering with competing airlines and an array of support services.

The relatively modern concept of the aerotropolis was also highlighted which shows that air cargo activity can spark a cluster of economic activity around the airport that has little relation to aviation, and that the airport can eventually feed off its own development to create even more air cargo demand. Whilst the evidence to date shows that it is the integrated carriers which initiate this development, such airports could possibly compete for the services which are currently drawn to the localisation economies offered by the major hubs.

Porter's cluster theory is particularly interesting in the context of this thesis as it links together both agglomeration theory in terms of the economies to be gained from locating in proximity to other firms and also the notion introduced by Hotelling of locations affecting market share in relation to competitors. Furthermore it is business strategy orientated, looking at future improvements to company practices rather than merely an explanation of past events.
The theoretical points raised in this chapter have served to assist in the development of research propositions and subsequently informed the design and details of the empirical stage of the research, as per the aim of this chapter. The nine research propositions are described in detail in chapter 4, but this chapter has contributed directly to three of these as well as confirming the importance of three others identified from the literature review. In particular this chapter has focused the attention of the research on the importance of locating in regions with a cluster of manufacturing companies and choosing airports where other companies such as partner airlines, competitors and freight forwarders operate, and ultimately finding a location with the lowest cost.

The findings from this chapter, together with the literature chapter provide a clear direction for the thesis and have assisted in precisely defining the research propositions. Subsequent chapters will reveal whether these propositions based on the existing literature and theory are applicable to the locations of non-integrated freighter operators or whether other factors separate from chapters 2 and 3 are more prominent.
4. Research Design and Methodology

4.1 Introduction

Having established clear objectives for the research as stated in section 1.3 and conducted an analysis of existing subject-specific and theoretical literature, it is now possible to specify research propositions that will guide the collection and analysis of the empirical data. This chapter therefore opens by listing the nine propositions for the research developed from the previous two chapters. Following this a comprehensive research design is developed to satisfy the objectives of the thesis, and this forms the main body of this chapter. Presented is the chosen ‘staged method’ approach, consisting of two surveys, six interviews and a case study, and provides justification for its use. The precise mechanics pertaining to the implementation of the methodology are discussed, for example how each method was designed, implemented and analysed with a common framework adopted as far as possible between methods. Research can be described as a way of thinking (Kumar, 1999) and therefore it is important that following the research propositions, this chapter addresses how the research is being approached on a philosophical level, identifying an ontological, epistemological and methodological position. The research design, outlining why the chosen approach was adopted is then outlined, followed by a discussion of the chosen methods and how they have been implemented.

4.2 Research Propositions

4.2.1 The nature and use of research propositions

In order to focus the research design in terms of how information is gained and what questions are asked, this thesis adopts propositions in the form of nine statements relating to possible outcomes of the research. These propositions have been developed based on the key themes emanating from the literature review and theory in chapters 2 and 3 respectively. Listed below is each of the nine propositions together with the precise origins of each, vis-à-vis chapters 2 and 3. These informed
propositions will be discussed in relation to the findings in chapter 8 and then reviewed in chapter 9, acting as a guide, in conjunction with the aim and objectives, for identifying the ultimate conclusions and contributions to knowledge of the thesis.

4.2.2 The propositions

Proposition 1

There are three main stages to the location of a freighter service consisting of a decision on which region to serve, followed by an assessment of vetoes and operating restrictions at the airports in that region and finally a detailed assessment of the attributes of the feasible airports.

This proposition, based on the process of airline decision-making, emanates primarily as a result of the findings from the literature review chapter which gave a clear indication of a three-staged process for a freighter operator choosing an airport.

Proposition 2

Freighter operators choose regions to operate to based on economic activity and are particularly attracted to regions with a cluster of companies manufacturing or receiving goods suitable for carriage by air.

This proposition relates to urbanisation economies that freighter operators can gain from locating at an airport serving a regional cluster as described by Porter (section 3.5), and seeks to confirm whether this is a consideration for them.
Proposition 3

*Costs are ultimately the most significant factor driving the location decision of freighter operators.*

Location theory, e.g. Weber (1929) and the literature, e.g. Cullinane and Toy (2000) both point towards overall costs as being the most significant locational factor for freighter operators and firms in general.

Proposition 4

*Freighter operators look to locate alongside competitors*

This proposition follows the theoretical findings of Hotelling (1929) who found that “there is an undue tendency for competitors to imitate each other in (terms of) location ...” (p.41), and Dicken and Lloyd (1990) who found that agglomeration economies “have a significant impact on the location of economic activities ...” (p.208).

Proposition 5

*Freighter operators look to locate with their alliance partners for interlining*

This proposition again relates to the localisation economies of agglomeration and in particular the benefits of locating close to complementary firms. In this case locating close to partner airlines can increase the scale of the overall operation and boost sales for all carriers.
Proposition 6

_Airlines which also operate passenger flights into the region chosen by the cargo division will have different priorities, choosing to locate their cargo services at the same airport as their passenger flights._

This proposition is consistent with Hall's (2002) finding that "passengers and freight are interdependent in international travel" (p.32). This was speculated in the literature to be particularly the case where the passenger airline operates widebody aircraft as these can carry a significant amount of belly cargo which will need to be handled and sorted. Combining the all cargo operations with this operation will lead to economy savings.

Proposition 7

_Freighter operators will locate where there is a concentration of freight forwarders._

This proposition is conspicuous in the literature with a number of authors namely Page (2003) and Schwartz (2002) identifying freight forwarders as an influential body when it comes to the location of freighter operators. This proposition also has a theoretical underpinning through Weber's (1929) theory of agglomeration which suggests that firms can gain economies by locating side by side with firms in the same or related industries.

Proposition 8

_Non-integrated freighter operators have a systematic preference for major gateway airports and secondary airports will find it difficult to succeed in attracting non-integrated freighter operators without the aid of one of two interventions, namely environmental legislation or congestion at a major hub._
This proposition is derived from the theory of agglomeration and in particular localisation economies, and proposes that freighter operators gain these economies of scale and economies of information from locating at major airports which have a larger concentration of support services. Given such a strong suggestion from the literature that major gateways are preferred for these reasons it is proposed that secondary airports positioning to attract cargo services will struggle to do so through marketing alone unless the main hubs become constrained due to environmental issues or congestion.

Proposition 9

*Marketing aimed at potential freighter operators can increase the chances of airports attracting such carriers. Secondary, lesser known airports have to be most proactive in marketing terms but also have the most to gain from such activity.*

This proposition comes from the literature which suggests that airport marketing can have an influence on cargo airline locations and in particular Page (2003) who identifies that marketing is most important for secondary airports as the airlines are less familiar with them.

4.3 Research Paradigm

All social scientists approach their subject via explicit or implicit assumptions about the nature of the social world and the way in which it may be investigated (Burrell and Morgan, 1979). It is therefore important to establish the research paradigm – the "*basic set of beliefs that guides action*" (Guba, 1990, p.17) to guide the design of the research.

A paradigm may typically comprise four primary concepts: epistemology, ontology, methodology and axiology (Fitzgerald and Howcroft, 1998) and each of these are discussed in turn in respect to this thesis. Within each of these premises there are two distinct approaches, in their simplified form termed 'hard' and 'soft'. These
competing arguments have been debated under a number of descriptive labels such as relativist-realist, interpretivist-positivist or qualitative-quantitative.

These two research paradigms have traditionally been seen as mutually-exclusive opposites (Burrell and Morgan, 1979). However a growing number of researchers (e.g. Bryman, 2001, Fitzgerald and Howcroft, 1998) are arguing that these approaches should not be viewed as mutually exclusive. For example qualitative techniques can complement quantitative ones in that they can help to interpret and illuminate empirically determined statistical relationships (Fitzgerald and Howcroft, 1998).

This research adopts a pragmatic approach when it comes to the research paradigm, taking the view that to commit to one or the other camps would be to limit the research design. Paradigms should serve as a lens to illuminate research issues, not as blinkers to close off other avenues of exploration (Fitzgerald and Howcroft, 1998).

The philosophy of the research is very much towards the "soft", qualitative stance, yet elements have been ‘borrowed’ from the opposing paradigm, such as the use of two survey questionnaires. As Easterby-Smith et al (1991) state, although the basic beliefs of the two paradigms are quite incompatible, when it comes down to the research methods and techniques used by researchers the differences are not so distinct.

Fitzgerald and Howcroft (1998) classify the ‘hard’ versus ‘soft’ debate into a simplified table (table 4.1) which whilst eliminating the subtleties of the various levels, nevertheless provides a useful overview of the issue. This table is therefore used as a framework for the paradigmatic discussion in this chapter.

4.3.1 Ontological Level

At the ontological level the debate between relativist and realist approaches and the following of one or the other, can have a fundamental impact on the nature of the research. At this level the question is asked of what kind of human being is the
### Ontological Level

**Relativist**
Belief that multiple realities exist as subjective constructions of the mind. Socially transmitted terms direct how reality is perceived and this will vary across language and cultures.

**Realist**
Belief that the external world exists of pre-existing hard, tangible structures which exist independently of an individual’s cognition.

### Epistemological Level

**Interpretivist**
No universal truth. Understand & interpret from researcher’s own frame of reference. Uncommitted neutrality impossible. Realism of context important.

**Positivist**
Belief that world conforms to fixed laws of causation. Complexity can be tackled by reductionism. Emphasis on objectivity, measurement and repeatability.

**Subjectivist**
Distinction between the researcher and research situation is collapsed. Research findings emerge from the interaction between researcher and research situation, and the values and beliefs of the researcher are central mediators.

**Objectivist**
Both possible and essential that the researcher remain detached from the research situation. Neutral observation of reality must take place in the absence of any contaminating values or biases on the part of the researcher.

**Etic/Outsider/Objective**
Origins in anthropology. Research orientation centred on native/insider’s view, with the latter viewed as the best judge of adequacy of research.

### Methodological Level

**Qualitative**
Determining what things exist rather than how many there are. Thick description. Less structured & more responsive to needs & nature of research situation.

**Quantitative**
Use of mathematical & statistical techniques to identify facts and causal relationships. Samples can be larger & more representative. Results can be generalised to larger populations within known limits of error.

**Exploratory**
Concerned with discovering patterns in research data, & to explain/understand them. Lays basic descriptive foundation. May lead to generation of hypotheses.

**Confirmatory**
Concerned with hypothesis testing & theory verification. Tends to follow positivist, quantitative modes of research.

**Induction**
Begins with specific instances which are used to arrive at overall generalisations which can be expected on the balance of probability. New evidence may cause conclusions to be revised. Criticised by many philosophers of science, but plays an important role in theory/hypothesis conception.

**Deduction**
Uses general results to ascribe properties to specific instances. An argument is valid if it is impossible for the conclusions to be false if the premises are true. Associated with theory verification/falsification & hypothesis testing.

**Field**
Emphasis on realism of context in natural situation, but precision in control of variables & behaviour measurement cannot be achieved.

**Laboratory**
Precise measurement & control of variables, but at expense of naturalness of situation, since real-world intensity & variation may not be achievable.

**Idiographic**
Individual-centred perspective which uses naturalistic contexts & qualitative methods to recognise unique experience of the subject.

**Nomothetic**
Group-centred perspective using controlled environments & quantitative methods to establish general laws.

### Axiological Level

**Relevance**
External validity of actual research question & its relevance to practice vital, rather than constraining the focus to that researchable by ‘rigorous’ methods.

**Rigour**
Research characterised by hypothetico-deductive testing according to the positivist paradigm, with emphasis on internal validity through tight experimental control and quantitative techniques.

Table 4.1: A simplified summary of ‘soft’ versus ‘hard’ research dichotomies.

researcher and what do they perceive as the nature of reality? (Bryman, 2001) This thesis holds to a relativist position with the belief that much of what is to be found is an extension of subjective meaning. The nature of the research topic does not lend itself to pre-existing, tangible structures, but rather requires a level of subjectivity in identifying what are really the most significant locational factors for freighter operators. Whilst this stance has impacted the entire design of the research, it has not closed off consideration of facets of the competing paradigm, although has contributed to the adoption of a predominantly ‘soft’ approach at the epistemological and methodological levels.

4.3.2 Epistemological Level

Epistemological assumptions are concerned with the grounds of knowledge about how one might begin to understand the world and communicate this knowledge (Burrell and Morgan, 1979). Everybody operates on the basis of some epistemological assumptions whether they know it or not (Fitzgerald and Howcroft, 1998) and this research follows an interpretivist, subjectivist approach.

The findings presented in this thesis are context dependent and in tune with the interpretivist approach, there is no “universal truth” to the research question, requiring a degree of subjectivity in its analysis.

As Smith (1983) describes, in cultural studies where the subject concerns the product of human minds, the interrelationship of investigator and what is being investigated is impossible to separate. It is recognised however that the most accurate form of observation from a research perspective is where the researcher is sufficiently detached so as not to influence proceedings, therefore one can be sure that a natural situation has been observed. Whilst following an interpretivist approach, it was felt important that a natural situation be observed but not influenced and this filtered into the design of the methodology.

As Fitzgerald and Howcroft (1998) describe, the paradox with an interpretivist view is that in terms of presenting the findings, a structured positivist approach is still the
preferred and accepted method, and the one used in this thesis. However, in the process of developing quantified measures of phenomena, for example through surveys, positivistic methods can strip contexts from meanings (Gephart, 1999) which is a reason for the use of a staged methodology, including face to face interviews, in order to provide that much needed context required by an interpretivist approach.

4.3.3 Methodological Level

The positions followed at the ontological and epistemological levels have direct implications on a methodological level. Traditionally the methodology issue has been a rivalry between qualitative and quantitative values, although as this chapter demonstrates, the idea of the two being complementary rather than competitive is growing in research consciousness.

Bryman (2001) for example recognises that quantitative and qualitative research are each connected with epistemological assumptions but does not view these connections as fixed. Indeed Bryman essentially views the two strategies as compatible, resulting in a multi-strategy approach becoming "feasible and even desirable", whilst Diesleg (1972) even argues that survey research and fieldwork are better viewed as two ends of a continuum rather than as two distinct kinds of methods. Similarly Lincoln and Guba (1994) believe the terms qualitative and quantitative should be reserved for a description of types of methods and not be used as an umbrella term superior to the term paradigm, believing that both quantitative and qualitative methods may be used appropriately with any research paradigm.

Therefore whereas a relativist-interpretivist paradigm may traditionally lead to the use of a qualitative methodology, this does not necessarily have to be the case, and the views of Bryman (2001) and Lincoln and Guba (1994) are echoed by Fitzgerald and Howcroft (1998), Fielding and Fielding (1986) and Easterby-Smith et al (1991) among others. This view that epistemological and methodological views needn't be inextricably linked intimates that a staged approach to the research, borrowing methods from both the qualitative and quantitative camps, is an appropriate direction to follow. Indeed Fielding and Fielding (1986) and Easterby-Smith et al (1991)
among others, argue that a methodology combining quantitative and qualitative methods is advantageous in providing more perspective into the phenomena being studied.

This research adopts such an approach. A quantitative approach in the form of two self-completion survey questionnaires was taken in order to reach as wide an audience as possible and to provide generalisable findings. However, this approach alone was not sufficient in terms of addressing the research objectives. As Easterby-Smith et al. (1991) find, such quantitative methods are not very effective in understanding processes—a necessity for this research. Qualitative methods on the other hand are useful for understanding processes and meaning. This gives credence to the combination of philosophies adopted, with the further use of interviews and a case study. This 'soft' position was further taken with the focus on fieldwork with an emphasis on context as opposed to precise measurement, which filtered into the design of the surveys with their open-ended nature.

Such triangulation of methods, defined by Denzin (1970, p.297) as "the combination of methodologies in the study of the same phenomenon" is felt by many to be an important element of a research design. Webb et al. (1966, p.174) for example find that "when a hypothesis can survive the confrontation of a series of complementary methods of testing it contains a degree of validity unattainable by one tested within the more constricted framework of a single method".

Hofstede (1980) too found that different methods provide different perspectives on what is being studied and therefore felt this sort of between-method triangulation was the best way to proceed, whilst Jick (1979) concurs, finding that organisational researchers can improve the accuracy of their judgements by collecting different kinds of data bearing the same phenomenon. This greater sense of validity of findings that a triangulated approach provides is one of the key reasons for adopting such an approach.
4.3.4 Axiological Level

Axiology is the science of human values and enables us to identify the internal valuing systems that influence our perceptions, decisions and actions. In a research context axiology is concerned with the worth of a piece of research, and in particular, as noted in table 4.1, with relevance and rigour.

However table 4.1 presents an 'either or' view, whereas the approach to axiology in this research is value free with both relevance and rigour being an important goal. In axiology rigour tends to refer to internal validity but this is only really relevant in studies that try to establish a causal relationship. In this study rigour is viewed as important with regards to a strong emphasis on triangulation and quality of method.

The subject of non-integrated freighter operator locations is approached in this thesis very much from a business strategy point of view in the mould of Porter (see section 3.5). In this regard the output from this research must be more than an explanation of past behaviour, it must explain how the strategy of airports and freighter operators can be improved in the future. This external validity required at the axiological level is gained through the use of multiple methods following the same basic framework which provide findings that can be generalised to the external world but that also provide a level of rigour, not necessarily through quantitative-based experimental testing, but more through the triangulated approach adopted.

The need for generalisability in the research and how this contributed to the choice of methods is discussed in the 'research design' section and throughout this chapter. The paradigmatic considerations discussed in this section had an impact on the design of the research and the choice of methods, and it is the selection of these methods that it the focus of the following section addressing the research design.

4.4 Research Design

Every empirical study has an implicit, if not explicit, research design. A research design is described by Yin (1994, p.18) as "the logic that links the data to be
collected to the initial questions of a study" and this is crucial to ensuring that the objectives of the research are addressed. The design of the methodology was therefore greatly influenced not only by paradigmatic concerns but particularly by the research aim, objectives and propositions

4.4.1 Criteria for Selection of the Research Design

Reviewing the aims, objectives and propositions led to the establishment of a number of criteria that the research design had to successfully address. The design clearly had to address the objectives of the research but in addition also had to:

- Provide direct access to airline and airport organisations;
- Capture experiences from a geographically dispersed set of organisations;
- Capture experiences from organisations of varying scales;
- Provide external validity and allow for generalisations of the outside world;
- Test the findings from the literature and preliminary studies;
- Be open-ended to allow for the accumulation of new knowledge;
- Allow for explanations of the relative importance of the factors uncovered;
- Allow for an understanding of the prevalence of certain factors;
- Provide for an understanding of the working relationship between airline and airport and the process of airport selection.

These nine criteria do not lend themselves to a single method and therefore a methodological approach utilising two international survey questionnaires and respective interviews of airlines and airports, as well as a case study of an actual location decision by an airline, is adopted.

4.4.2 The Chosen Approach

The literature chapter demonstrated that the area of airport choice for freighter operators is under-researched and therefore not only is the question of "why" and
"how" being addressed, but the more fundamental question of "what" are the factors that drive the geography of freighter operators. Yin (1994) finds that case studies are the preferred method when "how" questions are being posed, providing the focus is on "contemporary phenomenon within some real life context" (Yin, 1994. p.1). Equally the survey method is identified as appropriate where "what" questions are concerned, hence the multi-staged approach.

<table>
<thead>
<tr>
<th>Question Addressed</th>
<th>Focus</th>
<th>Data Collection Method(s)</th>
<th>Contribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surveys</td>
<td>&quot;What&quot;</td>
<td>General procedures, policies &amp; typical scenarios</td>
<td>Postal Questionnaire</td>
</tr>
<tr>
<td>Interviews</td>
<td>&quot;Why&quot;</td>
<td>General procedures &amp; policies with specific examples</td>
<td>Face to face interview</td>
</tr>
<tr>
<td>Case Study</td>
<td>&quot;How&quot;</td>
<td>Single specific case</td>
<td>Face to face interviews; Document analysis</td>
</tr>
</tbody>
</table>

Table 4.2: The complementary nature of the three research methods.

However this study does not employ simply a survey-case study approach as is perhaps most common, but rather uses the qualitative interview, viewed by Kvale (1996) as a "uniquely sensitive and powerful method for capturing the experiences and meanings of the subject's everyday world", as an extension to the survey questionnaires. This provides greater meaning and context (addressing the "why questions) to the generalisable findings of the surveys. Hence the two surveys identify what the most important factors are covering a wide population, the interviews expand on these findings and provide meaning as to why such factors are important, whilst, as Yin (1994) finds, the case study provides an insight into the causal processes. The three methods and their purpose are summarised in table 4.2.

There were sound pragmatic and methodological reasons why interviews and case studies were used as independent methods, and not as is most typical under the umbrella of case study research. One such reason is the distinction between
generality and specific cases. The focus of the surveys is not on specific instances of the phenomenon (i.e. airlines choosing airports) but rather with regards to general policies and actions in 'typical circumstances' and the interviews follow this same theme (although respondents were always invited to use specific examples where possible). The case study on the other hand takes one specific instance of an airline choosing an airport, hence its focus and construction differs fundamentally from the interviews.

Figure 4.1 summarises how the three primary methods integrate with the other key elements of the thesis.

4.4.3 Alternative Methods Considered

Whilst the approach chosen meets the criteria for the research design and is able to address each of the research objectives, it was not chosen without undertaking an evaluation of other possible methods to ensure the research design is robust and the most suitable available for the purpose.

The reasons for utilising the three methods in the way chosen have been discussed above, but other separate methods used in organisational research were also evaluated. However as is described in this section, they were ultimately not as suited to addressing the objectives of the research as the chosen methods were.

One such research design considered and then rejected was the use of action research which is an approach in which the researcher and a client collaborate in the diagnosis of a problem and the development of a solution (Bryman, 2001). In action research the investigator becomes part of the field of study and in the context of this research such an approach could involve an airport seeking to attract freighter operators. Whilst this approach is potentially attractive for this research as it allows unrivalled access to a particular organisation, any researcher participation in the phenomena under study risks influencing proceedings impacting the credibility of what is reported and going against the observational nature of this research. This also restricts the use of participant observation as a method of data collection as it risks losing, either
Chapter 4 - Research Design and Methodology

**Literature Review:** Previous research to inform research design and propositions

**Theory:** Overview of location theory to inform research design and propositions

**Aim:** Explore the factors influencing non-integrated freighter operators' choice of airport. + Objectives

**Research Propositions:** Will influence the design and analysis of the chosen methods

**Research Design:** Highlight how the aim and objectives of the research will be fulfilled

**Airline Survey:** Purpose to identify factors influencing airlines and their relative importance

**Airport Survey:** Purpose to identify marketing methods adopted and challenges facing airports

**Analysis of Airline Survey:** Identify the most important factors influencing cargo airline location decisions

**Analysis of Airport Survey:** Identify the main issues for airports in terms of attracting cargo airlines

**Preparation of Interview Questions:** Informed by survey findings and literature and theory

**Airline Interviews:** Semi-structured. Expand on survey & understand why factors are important

**Airport Interviews:** Semi-structured. Expand on survey & understand why factors are important

**Analysis of Interviews:** Data coded according to emerging themes & main findings highlighted

**Case Study:** Focus on interaction between airlines and airport in establishing services. Use of interviews and documents.

**Analysis of Case Study:** Within case analysis. Specific focus on processes of choosing an airport

**Analysis of all methods together:** Discussion of all findings in relation to propositions and theory

**Conclusions and recommendations:** Main findings and recommendations to airports

*Figure 4.1: An overview of the methodology and its relationship with other elements of the thesis.*
consciously or subconsciously, impartiality. On a pragmatic level action research is also difficult to establish as many organisations are reluctant to involve researchers so closely in their activities.

Another commonly used research method is the use of experiments. Experimental research where a researcher manipulates a variable under controlled conditions to test whether it produces any changes in a second variable, is a commonly used research method, with its strength in the strong claims of causality between variables (Bryman, 2001). However as Silverman (2001) notes, some quantitative methods such as experiments may simply be inappropriate to some of the tasks in the social sciences. In this research where the variables involve organisational behaviour, it is neither practical nor realistic to expect airlines and airports to permit any type of intervention in their practices, and any such intervention is not in keeping with the aim of the research which seeks to understand natural behaviour.

Whilst these alternative methods were not adopted, an appreciation of different approaches was important to the chosen research design insomuch as they challenged beliefs and ensured that the chosen approach was the most appropriate. The research methods adopted are now evaluated in detail.

4.5 The Research Methods

In this section the individual elements of the research design, namely the two surveys, interviews and case study are discussed from a methodology standpoint, focusing on the characteristics of each approach and the suitability of their use in this research.

Table 4.3 highlights the individual element of the research design which were used to focus the way in which the methods were empirically undertaken and the setting of questions to airlines and airports.
### Table 4.3: The Elements of the research design

<table>
<thead>
<tr>
<th>Method</th>
<th>Element of the research design</th>
</tr>
</thead>
</table>
| Airline Survey | - Identification of the most significant factors that influence freighter operators location decisions;  
                   - Identification of the relative importance of the above;  
                   - Test for evidence of agglomeration behaviour;  
                   - Identification of the external factors that influence the airlines.                |
| Airport Survey | - Identification of the main marketing methods adopted by airports;  
                   - Establishment of whether airports are in line with the freighter operators in terms of their thinking on what attracts the latter;  
                   - Identification of the main challenges for airports of differing characteristics  
                     - Establishment of airport “success factors”.                                    |
| Airline Interviews | - Understanding of why certain regions are chosen as locations;  
                        - A detailed evaluation of the most significant factors for freighter operators, i.e. why are they significant?  
                        - Examination of the level of importance for the factors identified;  
                        - Testing for evidence of agglomeration and cluster thinking;  
                        - Examination in more detail of the influence of support services such as freight forwarders. |
| Airport Interviews | - Evaluation of why particular marketing methods are used;  
                        - Identification of what airports feel are the reasons for their performance;  
                        - Evaluation of the constraining factors for airports and airlines and how this has affected them. |
| Case Study      | - Testing for evidence of clusters influencing the location of the airline;  
                   - Identification of the marketing methods used by the airport to attract the airline;  
                   - Identification of the factors that led the airline to choose the airport, particularly whether the marketing had any influence;  
                   - Examination of the processes involved in bringing a new cargo service to an airport from both sides. |

The characteristics of each of these methods are now evaluated in order to identify why each method is suitable to address these, and the broader research objectives.

#### 4.5.1 Survey Design

Surveys are a particularly appropriate method for producing “information to describe, compare, and predict attitudes, opinions, values and behaviour based on what people
say or see and what is contained in records about them and their activities” (Fink, 1995, p.14).

Whilst the main unit of analysis of this research is the non-integrated freighter operator and their location behaviour, the actions and opinions of airports are equally important to understanding why some airports are selected ahead of others. Two surveys are therefore adopted in order to gain an initial understanding of the main reasons for freighter operators' location decisions and also to understand the methods adopted by airports to attract freighter operators and general airport opinions on cargo to understand how closely they are matching airline expectations.

Three major methods are typically used to elicit information from respondents in survey research: the personal interview, the mail questionnaire and the telephone survey (Nachmias and Nachmias, 1982). Likewise, the types of questions asked can differ and can be of a closed or open ended nature.

The basis for the survey questions came from the literature review findings and the theory (chapter 3) and whilst there is a certain emphasis on testing the importance and prevalence of the factors identified here, there is also a focus on not restricting respondents in their answers, therefore both surveys make use of open ended questions where at all possible.

Both surveys are of the self completion questionnaire design, mailed out to airlines and airport according to the criteria detailed later in this chapter. The use of a mail questionnaire has many advantages, particularly a reduction in biasing error, greater anonymity for respondents, and greater accessibility for a broad geographical coverage (Nachmias and Nachmias, 1982). Given the large number of regionally diverse organisations from which an opinion was sought, the self completion mail questionnaire was the only method which could suitably canvas information from all intended respondents within the time and financial constraints of a thesis. Mangione (1998) identifies this ability of postal surveys to allow for a large number of widely distributed respondents to be surveyed in a relatively short time as one of this method’s key advantages.
Of the other most important advantages of mail surveys related to this research, Mangione (1998) finds that they allow respondents to:

- Take their time in answering and to look up information if needed;
- Answer questions at times that are convenient;
- See the context of a series of questions.

Using self-completion questionnaires, with a promise of confidentiality vastly reduces the risk of respondents not wishing to answer questions, and given its delayed format also allows respondents that know answers but can't recall them time to consider the response. This removes two of the four common situations identified below in which Fowler (1993) suggests that respondents provide less than accurate responses:

1. When they don't understand the question;
2. If they do not know the answer;
3. If they cannot recall the answer but know it;
4. Respondents do not wish to answer particular questions in an interview situation.

It is also important that each respondent is confronted with the same questions and the same opportunity to answer these questions. As Hague (1993, p.12) finds "the survey questionnaire provides a standard format on which facts, comments and attitudes can be recorded". The postal questionnaire has been used to good effect in many related studies such as Adler and Berechman’s (2001) study of airport quality to gain an insight into airlines’ opinions and decisions and to test previously held beliefs and is therefore ideal for this part of the research. It is for these reasons and the external validity which the method provides, that international surveys were chosen as an appropriate method for this research.

The survey method also has a number of weaknesses such as its limited scope for providing context to responses and its minimal exploratory potential (Bryman, 2001). Surveys are not able to illicit enough depth of response for it to be used as a standalone method for this thesis as the method is descriptive and not explanatory making cause and effect relationships difficult to establish. Therefore additional
methods are required to build on the surveys, particularly to provide extra meaning and context.

4.5.2 Interviews Design

Cannell and Kahn (1968) define the research interview as "a two person conversation initiated by the interviewer for the specific purpose of obtaining research-relevant information". The use of both airline and airport interviews is crucial to this research in order to allow for interpretations of the information gathered, which linked with the two surveys provides a staged approach for identifying not only the factors that influence freighter operators' location decisions but also explanations of these factors.

Interviews have the distinct advantage that they can be targeted, focusing directly on the research topic and are often used in situations in which the intervention being evaluated has no clear, single set of outcomes, as per this research (Easterby-Smith et al., 2002).

A further key advantage of the interview method is its flexibility in terms of questioning, allowing the interviewer to alter the question order, ask additional questions based upon responses, ignore other questions if they have already been addressed and probe for additional and more detailed information. As Nachmias and Nachmias (1982) describe, the interview allows greater flexibility the less structured it is and this is an important consideration as interviews can take on varying degrees of structure as figure 4.2 demonstrates.

![Figure 4.2: The varying degrees of research structure. Source: Gillham, (2000).](image)
Chapter 4 - Research Design and Methodology

The interviews conducted for this research were between the open-ended and semi-structured interview in terms of the continuum in figure 5.2, in that all questions were open but a number of questions targeted on specific themes were asked. For all interviews of both airlines and airports, an interview guide was utilised to indicate the questions to be asked and their ideal sequence in the interview (see appendices G and H). This was however used only as a guide with flexibility imperative in terms of when the questions were asked and which questions were posed based on responses. The questions themselves were specific to the information sought but care was taken not to lead the respondent to any particular conclusion.

In terms of the number of interviewees, it was decided to conduct three interviews with airlines and a further three interviews with airports. There is no agreement among researchers as to the ideal number of interviews for a study and it is dependent upon the aims of the individual research. Kvale (1996) for example finds that one should "interview as many subjects as necessary to find out what you need to know" (p.101). Typically it will always be argued that the number of interviews is too many or too few with a balance between loosing the ability to make generalisations when there are too few, and not being able to make penetrating interpretations when there are too many interviews (Kvale, 1996). Generalisations are not a priority of the interview method, yet interpretation is key, as per table 4.2, hence a smaller number of interviews were deemed appropriate. One of the primary reasons for choosing three was to allow for a diverse selection of organisations with three categories of airline and airport identified and one interviewee selected from each category.

As with the surveys, the primary weaknesses of the interview method are addressed by other methods. For example with a small number of interviews, external validity is compromised as is the ability to quantify findings or identify differences in attitudes and opinions from diverse organisations. However these are all advantages of the survey method and are therefore covered as part of the overall research design.
4.5.3 Case Study Design

The case study can be broadly defined as "an extensive examination of a single instance of a phenomenon of interest ..." (Hussey and Hussey, 1997, p.65). Looking at case study research in more detail, it consists of "a detailed investigation, often with data collected over a period of time, of one or more organisations, or groups within organisations, with a view to providing an analysis of the context and processes involved in the phenomenon under study" (Hartley, 1994, p.208). Yin (1994) describes the case study as an all encompassing method and a comprehensive research strategy which is "ideal to explore those situations in which the intervention being evaluated has no clear, single set of outcomes" (P.15).

A single case study focusing on a successful example of an airport attracting a freighter operator is the final element of the multi-method research design used in this thesis providing a deeper insight into the airline-airport relationship and the processes involved in terms of an airlines decision to operate to a particular airport. A single detailed case study can be just as effective as multiple studies depending on the aims of the research (Yin, 1994). As the case study is being used as part of a multi-method approach, potential disadvantages of using just one case study such as the inability to probe different cases for subtle differences and to make generalisations based on the findings, are severely reduced, as these issues are addressed elsewhere in the research.

4.5.3.1 Case Study Question

In order to focus the collection and analysis of the case study information, the following specific case study question was designed which encompasses the specific aims of this element of the research:

"What are the mechanisms and policies that Dallas/Fort Worth airport has put in place in order to create an environment which would attract non-integrated freighter operators and what are the reasons and processes involved in China Cargo Airlines deciding to operate there?"
The focus on processes, as per objective 5 of the research (see section 1.3) is particularly important as this is something the other methods cannot capture as effectively. As Hartley (1994) states, the capacity of the case study to explore social processes in organisations is one of its fundamental strengths. By using multiple and often qualitative methods including observation, much more can be learned about processes than is possible with other techniques.

A case study is not a method as such but more a research strategy (Yin, 1994, Hartley, 1994). This strategy can be used to accomplish various aims, such as to provide description, test theory, generate theory, or as already mentioned to examine processes (Eisenhardt, 1989). Scapens (1990) argues that case studies are a particularly appropriate strategy in areas where theory is not well developed. Whilst there is a theoretical vein running through this research (location theory), its application for looking at the location decisions of freighter operators is untested and any necessary additions to location theory knowledge from this research are stated in chapter 9.

### 4.5.3.2 Different types of case study

Case studies can be exploratory, descriptive or explanatory (Yin, 1993). The case study design used for this research is explanatory, although the deficient body of knowledge on the subject also brings the subject into the sphere of exploratory case study research. Explanatory case studies attempt to explain the reasons for certain phenomena with the focus on a specific case (Scapens, 1990) where the aim is to understand and explain the specific, rather than to produce generalisations. This approach allows for theories to be modified if they do not provide convincing explanations.

Yin (1994) stipulates as an overriding principle of case study research the use of multiple sources of evidence, which may include documents, archival records, interviews, direct observation, participant-observation, and physical artefacts. A triangulated data source approach is adopted for this research. The main element is a face to face interview with the airport and a further interview with the airline. The
questions posed differ from those asked during the main body of interviews, in that there was a specific focus on the single case rather than questions related to how the airline chooses airports in general or how the airport generally seeks to attract carriers. For the case study the questions were in the past tense rather than the present tense for the main body of interviews. The questions do however remain of an open-ended nature. As Yin (1993, p.62) states: “although investigators should have a good working knowledge of the previous research literature on the topic being investigated, the knowledge should not close their minds to emergent categories”. Using questions more towards the open ended side of the continuum makes emergent categories easier to identify.

In terms of other data sources, documentation was used to supplement the interview data and was particularly useful in providing information on the strategic vision of the airport and how significant cargo was within this vision. This was particularly useful as the interviewee was perhaps better placed to impart knowledge on the processes of air services development than to talk authoritatively on the airport planning and development issues. Airport marketing literature was also used in order to highlight, further to the interviews, the direction that the airport’s marketing focus is taking, whilst press releases and magazine articles further highlighted this, both generally and in relation to the specific case. Visiting the airport also allowed cargo practices to be observed which was valuable evidence to accompany what was said in the interviews. As Yin (2003) finds, “observational evidence is often useful in providing additional information about the topic being studied” (p.93).

As with all methods case studies have their weaknesses, as Hartley (1994) identifies, some researchers still view case studies as a method lacking rigour and reliability which do not address the issues of generalisability which can be effectively tackled by quantitative methods. The issue of rigour and reliability are two of the reasons why Hartley (1994) finds that using both case study and other research strategies in different phases of a research project is advantageous to provide reliability and generalisability to the study which the surveys, interviews and case study together achieve.
4.6 Implementing the Research Methods

Having identified which methods are adopted for this research, the reasons for their use and their suitability for meeting the thesis aim and objectives, this section focuses on the implementation of these methods in practice, with particular attention paid to why specific respondents were chosen, what procedures were followed and how the raw data was analysed.

4.6.1 Survey Method

This section explains for both the airline and airport survey exactly who was surveyed, how the respondents were chosen, the processes for administering and testing the surveys and the method used to analyse them and develop findings for the research.

4.6.1.1 Identifying the respondents

Airline Survey

For the airline survey a worldwide census of non-integrated freighter operators was undertaken and a total of 118 airlines meeting the criteria for the research i.e. airlines operating non-integrated scheduled freighter services were identified. The data source used was the Flight International 2003 World Airline Directory. This detailed directory lists airlines operating one or more aircraft with 19 or more seats, or the equivalent cargo capacity (which essentially includes all freighter aircraft). Under the parameters of this research, airlines with leased freighters operated by other carriers were included as the airlines are still making the decision as to where the aircraft operate. British Airways for example were included as a freighter operator even though all their 747 freighters are operated by Atlas Air. The fleet data, from which the survey population was drawn, was compiled by consultancy Airclaims and the entries in the directory were accurate as of January 2003.
Once the names of the airlines were identified from the Flight International directory, a thorough checking process was undertaken to ensure that the airlines selected fitted the research criteria. This included internet searches and visits to the airline’s website to verify that they indeed operated freighter aircraft and that these were operated on a scheduled basis. On the occasions that this information was not available online a telephone call was undertaken or email was sent to the airline to confirm this information. Identifying new entrants since the publication of the database was also a priority and air cargo industry serials were consulted for this purpose. Through this method a small number of carriers, such as Qatar Airways, who had begun cargo services following the publication of the Flight International database, were identified. These checks led to an initial 150 airlines being reduced to the final census number of 118 to whom the survey was sent.

Given that the survey aims to test previous assumptions and to uncover some potentially new information, it is advantageous to work with as large a sample as possible. Although a stratified sample involving TIACA member airlines was considered, it was thought that given that the entire population was of a manageable size it was best to avoid the problems of sampling error and survey the entire population. As Czaja and Blair (1996, p.129) find “the only way to estimate a population value without sampling error is to include every element in the population”.

Once an accurate database of airlines had been established it was crucial to ensure that the survey reached the most appropriate member of staff at the airline. This information was gained in a number of ways. Firstly it was identified that given the TIACA sponsorship of the research, the survey should be sent to the TIACA contact at the member airlines to potentially increase the response rate as a result of the publicity the organisation had given the research in their newsletter. The TIACA contact is typically at a fairly senior level within the organisation, and even if this person was not necessarily the most appropriate contact in terms of answering the questions, their affiliation with TIACA would prompt them to encourage the most appropriate person to complete the questionnaire. 32 of the airlines surveyed were TIACA members. Utilising TIACA members was particularly useful as Mangione
(1998) states that response rates are higher when the research sample has a moderate to high investment in the topic.

In finding contacts for the other airlines a number of methods were used. The flight International directory provides the names of key personnel within the various airlines. However again this data could not be 100% relied upon as it was not the most up-to-date. Therefore the first method of gaining information was again from visiting the airline’s website and looking for the relevant data. In most cases the first contact searched for was the business or route development manager, where this position existed. Where this position did not exist, the list of contacts was searched for the most appropriate manager. Where no appropriate contact was listed or no contacts were listed at all, a telephone call was made to the company to enquire as to the most appropriate person to which to send the survey. In a small number of cases this was not successful due to such issues as language barriers. In these cases the contacts originally provided in the Flight International directory had to be used.

The response rate for the airline survey was 33%, with 39 actual responses. The exact break down of respondents by region and type of carrier in terms of whether they mainly operate long haul or regional flights, is contained in tables 4.4 and 4.5 respectively. The questionnaire itself can be found in appendix A.

<table>
<thead>
<tr>
<th>Region</th>
<th>Respondents</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Africa</td>
<td>3</td>
<td>7.7%</td>
</tr>
<tr>
<td>Asia / Pacific</td>
<td>11</td>
<td>28.2%</td>
</tr>
<tr>
<td>CIS</td>
<td>2</td>
<td>5.1%</td>
</tr>
<tr>
<td>Europe</td>
<td>11</td>
<td>28.2%</td>
</tr>
<tr>
<td>Latin America</td>
<td>2</td>
<td>5.1%</td>
</tr>
<tr>
<td>Middle East</td>
<td>4</td>
<td>10.3%</td>
</tr>
<tr>
<td>North America</td>
<td>6</td>
<td>15.4%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>39</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Table 4.4: Geographic profiles of the respondents and the sample
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Table 4.5: Operational profiles of the respondents and the sample

<table>
<thead>
<tr>
<th>Length of Haul</th>
<th>Respondents</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long Haul</td>
<td>16</td>
<td>40</td>
</tr>
<tr>
<td>Regional</td>
<td>18</td>
<td>61</td>
</tr>
<tr>
<td>Domestic</td>
<td>5</td>
<td>17</td>
</tr>
<tr>
<td>Total</td>
<td>39</td>
<td>118</td>
</tr>
</tbody>
</table>

Airport Survey

Given the much larger population of airports worldwide than non-integrated freighter operators, it was not practical to survey all airports and therefore a sample was taken for the airport survey. A significant number of airports worldwide do not have freighter operations and more tellingly do not desire to attract such carriers and it was felt that to meet the objectives of this method it was necessary to survey airports that have a declared interest in attracting freighter operators.

The most appropriate way to identify airports who had an interest in attracting freighter operators was therefore to use TIACA member airports as the sample, as their membership of an air cargo association provides evidence of their enthusiasm for developing cargo services. As of August 2004 there were 70 TIACA member airports and these 70 regionally dispersed airports constituted the survey population.

With regards to identifying the actual recipient of the questionnaire it was decided that the designated TIACA representative for the airport would be contacted for the reasons explained for the airline survey. In the case of the airports this was a particularly appropriate way to proceed as the TIACA representatives were almost exclusively the airport managers responsible for developing freighter services. This also made access to reliable contact information relatively straightforward compared with the airline survey.

The response rate for the airport survey was 57%, with 40 actual responses. The exact break down of respondents by region and size of airport measured in freight
handled is contained in tables 4.6 and 4.7 respectively. The questionnaire itself can be found in appendix D.

<table>
<thead>
<tr>
<th>Region</th>
<th>Respondents</th>
<th>Sample Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asia / Pacific</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Europe</td>
<td>17</td>
<td>25</td>
</tr>
<tr>
<td>North America (USA/Canada in parenthesis)</td>
<td>21 (13/8)</td>
<td>34 (25/8)</td>
</tr>
<tr>
<td>Other</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>40</strong></td>
<td><strong>70</strong></td>
</tr>
</tbody>
</table>

Table 4.6: Geographic profiles of the respondents and the sample

<table>
<thead>
<tr>
<th>Annual (Metric) Tonnage</th>
<th>Respondents</th>
<th>Sample Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 50,000t</td>
<td>8</td>
<td>22</td>
</tr>
<tr>
<td>50,000-100,000t</td>
<td>6</td>
<td>13</td>
</tr>
<tr>
<td>100,001-250,000t</td>
<td>10</td>
<td>12</td>
</tr>
<tr>
<td>250,001-500,000t</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>500,001-1,000,000t</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>More than 1,000,000t</td>
<td>6</td>
<td>9</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>40</strong></td>
<td><strong>70</strong></td>
</tr>
</tbody>
</table>

Table 4.7: Size profiles (cargo handled) of the respondents and the sample

4.6.1.2 Administering the surveys

Covering Letter

Methodologists have a concept that they call ‘total survey design’. By that, they refer to the perspective of looking at all sources of error, not just a single source, when making survey design decisions. As Fowler (1998, p.343) finds “the quality of data
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from a survey is no better than the worst aspect of the methodology’. With this in mind particular attention is paid not only to the design and testing of the survey questions, but also to other important aspects of the design such as the covering letter and a structured process of follow-up (reminder) letters.

A number of authors, for example Czaja and Blair (1996), and Mangione, (1998), have highlighted the effectiveness of a good covering letter in improving response rates. Czaja and Blair (1996) find that the following should be included in covering letters (in the order indicated):

- Details on what the study is about; why it is important; how the study results will be used;
- Why the respondent is important to the study;
- How the respondent was selected;
- A promise of confidentiality;
- A phone number to call if the respondent has questions and a contact name to reach at that number.

Whilst the surveys are not anonymous (information on the respondents was required in the data analysis stage, and also when planning reminder letters), the particular responses were kept confidential. A promise of confidentiality is very important and is usually enough when anonymity can not be granted. As Mangione (1998, p.403) finds “respondents are generally more likely to respond if they feel that their answers will be kept confidential”.

All of the above elements were incorporated into the covering letters and respondents were also offered a summary of the findings as an incentive to respond. A smaller self addressed envelope was included to help the respondents with the survey's return. See appendices C and F for the covering letters used for the initial mailings for both surveys.
Mailing Procedure

All of the airline surveys were mailed to respondents using the contact details identified both from the Flight International directory and the subsequent name verification stage, which also sought to check the accuracy of the postal addresses provided.

Reminder Letters

"Probably the single most important technique for producing high response rates is the use of reminders" (Mangione, 1998, p.406).

The pattern of reminders for this research followed the approach of Mangione (1998) who suggests three reminders in all, with each wave returning approximately half the return rate achieved in the previous wave (e.g. if 40% are returned in the initial mailing, another 20% will be returned after the first reminder). Non-respondents were tracked through the inclusion of a unique identification number marked on the questionnaire. Those returned were ticked off a checklist with reminders sent to those that hadn't been returned.

Given the international nature of this survey, and longer postal times, the timings of the reminders were a little later than the two week interval suggested by Mangione. The first reminder was sent out three weeks after the initial mailing to those who had not replied. This consisted of a letter reiterating the importance of the research and how they could benefit (through the offer of a summary of the results), along with a replacement questionnaire and return envelope. A further reminder letter was sent after a further three weeks and then finally following another three week period a final reminder letter was sent, again accompanied by a replacement questionnaire. This letter again emphasised the importance of the respondent to the research and also emphasised the confidentiality of the questionnaire. This final reminder also included a deadline for responses. For final response rates see section 4.6.1.1.
4.6.1.3 Question Design

The design of the questions for both surveys arose from the literature review and theory chapters. Although the theory and indeed the literature on this subject are not well advanced, they nonetheless provided the research with a set of themes and propositions which could then be developed into questions. However whilst there were a number of areas which could be tested in a closed fashion, the lack of literary references directly relating to the location decisions of non-integrated freighter operators lent itself to a number of open ended questions which did not restrict the respondents to set responses. The justifications surrounding each of the questions for both surveys are included in appendices B and E.

4.6.1.4 Testing the questionnaire design

"Underlying the first questionnaire draft is our judgement about what respondents will know, what words they will understand, (and) what sorts of information they can and will provide ... In a first draft of a survey question, one or more of these assumptions are likely to be wrong for many respondents" (Czaja and Blair, 1996, p.93). Therefore the questions and survey format required testing.

De Vaus (1996) identifies three stages of pilot testing for survey questionnaires:

1. **Question development.** This is a declared pre-test and is designed to test that the questions are interpreted correctly. Respondents are asked how they might phrase questions differently, what they had in mind when they gave a particular answer, and for closed questions if there are any unavailable answers they would have preferred to have given.

2. **Questionnaire development.** This is often an undeclared phase. This is a simulation of the actual mailing to test processes and responses.

3. **Polishing pilot test.** Here information gained from the first two stages is used to revise the questionnaires.
Both questionnaires underwent rigorous testing during the development stage. Five prominent academics and industry professionals were consulted on the design and content of the questionnaire before piloting on airlines began. These referees were Professor Richard de Neufville of the Massachusetts Institute of Technology (MIT), Graham Francis of Waikato University, New Zealand, Daniel Fernandez of The International Air Cargo Association, Andrew Burrows, air cargo consultant, and Steve Guinan of the British Cargo Airline Alliance.

These respondents helped in refining the wording, ordering and layout of the questionnaire, as well as suggesting further questions to ask. Prior to even developing the questionnaire, surveys compiled by experienced researchers, and professional agencies were studied as examples of style and layout.

When testing the questions on the respondents, Hoinville and Jowell (1978) suggest a number of things to look for. Important among these are whether they had to re-read the question before it was understood; whether they had any difficulty finding their way through the questionnaire; whether there were any points at which interest flagged; and whether they felt the questionnaire was too long or detailed in parts. The respondents named above were all asked to comment on these.

A small questionnaire\(^1\) distributed to 17 freighter operators serving four airports in the UK Midlands had been completed prior to the commencement of this research with a response rate of 71% achieved. This simulation of mailing processes and responses satisfies stage two of De Vaus' (1996) three stage process. This survey, with its high response rate (even without follow-up mailings) demonstrated an interest and an appetite to respond to the survey from the air cargo community. As Hague (1993) finds that for small studies of around 100 respondents, half a dozen pilot questionnaires are sufficient, 17 pilot questionnaires for samples of 118 and 70 was deemed sufficient for testing this method.

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\(^1\) Compiled by the author. Unpublished reference.
4.6.1.5 Data Analysis Procedures

The survey data was analysed quantitatively using the SPSS statistical software program. This allowed frequencies and cross tabulations to be performed both expeditiously and accurately.

For the analysis each response was given a pre-determined code with the appropriate code being entered into the SPSS spreadsheet for analysis. Whist this is straightforward for the closed questions, the open-ended questions or questions permitting more than one response, required varying methods in order to assign the codes and enter them into the spreadsheet.

For question 13 of the airline survey (see appendix A) where respondents are asked to tick all that apply, the multiple dichotomy method of coding the data was used. Here a separate variable was created for each of the categories of the question. A ‘yes’ and a ‘no’ code were used to indicate whether this option had been chosen. This allows frequency distributions to be obtained for each variable.

In order to analyse the open-ended survey questions content analysis was used. Each response was first read, cleaned and then coded to add to the codebook created for the closed ended questions. Similar answers were cleaned and grouped together under one code. In terms of entering the various codes into the spreadsheet the multiple response method was used. Here variables were added based on the maximum number of answers provided. For example if one respondent gave four different factors and the rest have three or less, then four variables were created. Each factor was then coded and then entered. This method allows frequencies and cross tabulations to be completed.

The aim of many of the questions is to understand the prevalence of certain phenomena and therefore frequencies were an important tool for analysis. The impact of various dependent variables on responses also made the use of cross tabulations an important element of the analysis, the exact factors to cross tabulate again coming from potential causations suggested in the literature and these are mentioned under the justifications for the relevant survey questions in appendices B and E.
4.6.2 Interview Method

Face to face interviews were conducted with three airlines and three airports and this section explains how and why these airports were chosen, the specific mechanics of conducting the interviews, including the questions posed, and the way in which the interviews were analysed.

4.6.2.1 Identifying the Respondents

Airline Interviews

In identifying which airlines to survey a number of criteria were considered, in addition to the airlines having to possess the qualities that define the focus of the research i.e. operate regular, scheduled, non-integrated freighter services. As the airline survey was sent to the entire population of scheduled non-integrated freighter operators, the opportunity was used in the survey to identify those airlines who were willing to participate in the interview stage of the research should they be required. A willingness to participate was therefore the first of the criteria, and of the 39 respondents, 12 indicated that they were willing to do this. The responses that the airlines gave to the survey were considered as part of the evaluation process in terms of their value to the research and the potential to obtain further detailed information from the respondents. Whilst not tangible criteria, choosing the respondents that would provide the most detailed, interesting and relevant information was a further consideration. Finally obtaining regional diversity of respondents was another priority as cross tabulations from the survey data had revealed a number of differences in responses from airlines based upon their home region. On this same theme it was considered an advantage that the airlines should operate a range of routes from and to a variety of regions, in order to collectively convey experiences with locating services in all the major world markets. Three airlines fully met this criteria and were therefore chosen for interview.

In terms of exactly who to interview at the chosen airlines, the survey respondent was contacted as their credentials had already been tested with the survey. When
contacting these gatekeepers however they were also asked whether any other members of their organisation contributed at a senior level in route decision making and they too were invited via the gatekeeper to take part in the interviews.

A brief description of each participant airline and specific interviewees vis-à-vis the above criteria follows. It is important to note that where two interviewees are listed, they both participated in the same single interview:

**Airline 1: MK Airlines:**

**Base Country:** United Kingdom  
**Regions of Operation:** Continental Europe / Africa  
**Main reasons for choice of case:** The airline has experience of locating freighter services in the United Kingdom, Continental Europe and throughout Africa and can therefore provide multiple perspectives on locating services and working with airports with vastly differing profiles. At the time of the interviews this airline was also making news stories after it abandoned Manston Airport in south east England in favour of Ostend in Belgium, making the research subject relevant to the thinking of the airline at that time.

**Interviewee 1: Managing Director / Majority shareholder**  
This interviewee is the most senior person within the organisation. As the airline is still only very small this individual is directly involved in choosing airports to serve and ultimately makes the final decision. This person receives input from other members of his organisation in making the decision but is very hands on and will often attend important meetings with airports himself. This individual is therefore the most knowledgeable with regards to the factors affecting the airport locations of that airline.

**Interviewee 2: Risk and Legal Manager**  
This interviewee has a direct input into the airport locations of this airline in that they are responsible for assessing potential airports in terms of their suitability from an operational safety and security point of view and also deals with airports in terms of contracts and other legal aspects of the interaction.

**Interview location:** Airline headquarters, Hartfield, East Sussex.  
**Duration:** 70 minutes.
Airline 2: Kalitta Air
Base Country: United States
Regions of Operation: North America / Europe
Main reasons for choice of case: Geographically this airline differs from the other airlines as its main sphere of operation is in the US domestic market, although has recently expanded into services to Europe, including services to Amsterdam and Nottingham East Midlands Airport. Starting with a clean sheet it was deemed interesting to understand why these European airports were chosen given the variety of choices available.

Interviewee 1: Regional Manager, Europe.
This interviewee is responsible for the airline’s operations in Europe and as such had a key role to play in the selection of European destinations for the airline. This individual visited the airports and met with the airport cargo managers during the evaluation process and undertook the majority of evaluation work, with a decision made jointly by the interviewee and managers back in the United States. This individual was accessed via a “gatekeeper” in the airline’s US office who identified this person as the most informed employee to answer the research questions.

Interview location: Sheraton Skyline Hotel, Heathrow Airport
Duration: 60 minutes.

Airline 3: Dragonair
Base Country: Hong Kong
Regions of Operation: Asia / Europe
Main reasons for choice of case: Having a European and North American perspective, it was felt important to also have the perspective of an Asian carrier. Dragonair were ideally suited to this as until relatively recently the airline was purely a passenger carrier before commencing freighter services to Europe in the late 1990s, and more recently has begun to expand the number of European destinations on its network. Given the highly competitive market between Asia and Europe this was felt to be a particularly interesting case, particularly with regards to the impact competitors had on their location decisions.
Interviewee 1: Regional Manager, Europe.  
This interviewee had been in this position with the company from the establishment of the cargo division of the airline and was therefore directly involved with choosing the European airports that the airline would serve.  
Interview location: Airline office, Manchester Airport.  
Duration: 60 minutes.  

Airport Interviews  
The main criteria for choosing the airport interviewees was that they each add a new perspective on the phenomena being studied through their diversity. A key objective of the interviews was to explore more deeply the findings from the survey research and literature review to provide explanations and a different perspective. In order to provide validity to the findings it was felt that each interview should be with an airport belonging to one of the following three diverse categories:  

Large Passenger / Cargo Airports. These major airports have a strong passenger focus although also have a number of freighter services and should be interested in developing their cargo business and have sufficient infrastructure to facilitate this.  

Secondary Cargo Airports. These airports target cargo operators as its core business. The site has a wide range of technical infrastructure for such operations. These airports may also be secondary passenger airports.  

New industrial airport developments. These airports target cargo operations and were built or converted from military use with cargo as the main objective. These airports do not have to have incumbent carriers to be selected, but merely a strong desire to attract them, as it is just as relevant to understand why an airport is not attracting carriers as to understand why they are.  

Initial responses from the survey of airports revealed that the experiences of these three types of airport were very different in terms of their relationship with freighter
operators and their efforts to attract them, and therefore having one airport from each of these categories was the first of the criteria for identifying the interviewees.

It was also felt important to include regional diversity and not to have all three airports based in the same region. For reasons of accessibility, the two regions focused on were Europe and North America. Clearly Asia is a very important region for non-integrated freighter traffic, and whilst new airports are being developed to compete with the existing mega-hubs such as Hong Kong and Singapore, at the time of conducting the research there is less effective competition for these hubs as there is in Europe and North America meaning that for many freighter operators their choice is automatic. Many of the airlines operating to the chosen airports were Asia-based though and this region is heavily represented in this research.

Within these categories though there were still a significant number of airports from which to choose based on additional criteria, particularly a willingness to participate. As with the airline survey, the airport survey directly asked respondents whether they wished to take further part in the research, in this case the majority of respondents, 27 out of 40 respondents were willing to do this. The final element of the selection criteria was that the airport must demonstrate a desire to attract cargo services. The most effective way of ensuring this was to limit the choice of airports to the survey respondents, who had already been selected based on their TIACA membership.

In terms of exactly who to interview at the chosen airports, the survey respondent was again contacted and were again asked whether any other members of their organisation contributed at a senior level in cargo development and they too were invited via the gatekeeper to take part in the interviews.

A brief description of each participant airline and specific interviewees vis-à-vis the above criteria follows. Again where there are two interviewees listed both were participants in the same single interview.

Airport 1: Manchester Airport, UK
Operational Category: Large Passenger / Cargo Airport
Region: United Kingdom
Main reasons for choice of case: The airport has a large number of passenger services, handling over 20 million passengers per annum, but also has a growing portfolio of freighter operators, predominantly from the Asian region. The airport is an active member of TIACA and is actively seeking to increase its freighter operations making it a perfect fit for this category. From a pragmatic point of view the airport is accessible and was enthusiastic about participating in the research.

Interviewee 1: Industry Affairs and Cargo Manager
This interviewee is the person most directly responsible for the day to day running of cargo at this airport with the main roles of developing new cargo services as well as liaising with existing operators, and representing the airport on any issues relating to cargo. This person is involved in all negotiations with potential new operators at the airport and attends events such as the air cargo forum in order to promote the airport to new operators and network with their representatives and is therefore the most knowledgeable manager at the airport with regards to fulfilling the aims of this research. The interviewees extra industry affairs responsibility also provides a perspective on the issues regulatory restrictions raise for the airport in terms of cargo operations.

Interviewee 2: Cargo Accounts Manager
This interviewee is the only other member of staff at the airport with a direct cargo remit and is responsible for all day to day interactions with cargo airlines and support services and works with the cargo manager in promoting the airport to cargo airlines and has contact with them with regards to the fine detail of operating to the airport.

Interview location: Manchester Airport.
Duration: 80 minutes.

Airport 2: Nottingham East Midlands Airport, UK
Operational Category: Cargo Airport
Region: United Kingdom

Main reasons for choice of case: The majority of traffic at this airport is freighters operated by 3 integrated freighter operators, namely DHL, UPS, and TNT. It was chosen to see how this integrator focus affected non-integrated carriers, of which the airport has only two which contrasts well with the other selected airports. The airport is also owned by Manchester Airport, and there was particular interest to see how this would affect the cargo situation at both airports.
Interviewee 1: Cargo Manager
This interviewee is in overall control of cargo affairs at the airport, and is responsible for the development of air cargo services and is therefore able to provide an all-inclusive perspective of air services development at the airport. This person was the main contact between the airport and freighter operators, either existing operators or potential ones and attends a number of events in order to physically promote the airport to potential new operators. This person also works closely with other departments at the airport such as marketing to ensure the airport’s cargo operation is properly represented in trade serials.

Interviewee 2: Planning and Development Director
This interviewee provides a senior perspective on how cargo fits in in terms of the overall operations at the airport, particularly in terms of infrastructure planning and the priority afforded to this segment.

Interview location: Nottingham East Midlands Airport
Duration: 80 minutes.

Airport 3: MidAmerica St. Louis Airport, Illinois, USA
Operational Category: New Industrial Airport
Region: United States
Main reasons for choice of case: A military joint use facility, it sees air freight as its primary business objective. The airport is in the early stages of its development with no carriers at the airport, providing the opportunity to understand the airports strategy to develop. The airport is pro-active in marketing, although is located in a competitive environment for air cargo, making it an interesting airport to focus on.

Interviewee 1: Airport director
This individual is in overall charge of the airport. Given the small size of the airport, the Director takes a very hands-on approach and is the face of the airport as far as potential freighter operators are concerned, attending trade shows, contacting airlines and appearing regularly in the industry press. As the airport has no air cargo services the main role of the director at present is to reverse this, meaning this individual can provide an all-encompassing perspective for this research.

Interview location: MidAmerica St. Louis Airport.
Duration: 90 minutes.
4.6.2.2 Interview Questions and Processes

For all of the airports interviewed a visit was made to the airport site to interview the individuals identified above, and in two cases to take a tour of the airport cargo facilities, which provided a greater insight into their operations and aspirations. In the case of the three airlines interviewed, one was undertaken at the airline's headquarters, whilst the other two were, for pragmatic reasons, namely to fit with the respondent's schedules, undertaken at neutral locations. All of the interviews lasted approximately one hour and were recorded for the purpose of accurate analysis, as explained in the next section.

For all interviews of both airlines and airports, an interview guide was utilised to indicate the questions and their ideal sequence in the interview (see appendices G and H). In order to undertake the interviews at the open end of the structure continuum, a great deal of flexibility was built into the interview process with the emphasis on the interviewee leading how the interview progressed based on their responses, with the guide used to ensure all the key question topics were addressed. As Rubin and Rubin (1995) identify, it is important that the qualitative interviewer remains flexible and attentive to the variety of meanings that may emerge as the interview progresses. This was mainly achieved by beginning with an open question designed to elicit as much information with regards to the research topic as possible, and only then were more focused questions asked.

For the airline interviews the initial question asked was "What are the most important considerations for your airline when choosing an airport for your scheduled freighter operations?" For the airport interviews the first, open question was "What are the most important factors that would lead a freighter operator to want to operate to your airport?"

From these initial questions, responses were probed and then followed up as necessary by asking further questions based on those in the interview guide which is included in appendix G and H for the airline and airport interviews respectively.
The origin of the questions is very much based on those for the surveys and are included essentially for the same reasons, although the prior analysis of the surveys and the issues that required clarification, explanation or further information from these set the tone for the choice of questions.

4.6.2.3 Analysing the Interview Responses

The first stage in the analysis of the interviews was to produce transcripts from the recordings. Once detailed transcripts had been produced and checked against the recordings, responses from all the airline and airport interviews were grouped into respective categories, with those used for each type of interview closely linked for ease of analysis.

In order to identify the categories an inductive content analysis of the interview data was undertaken. This involved reading through the transcripts focusing on emerging themes, particular characteristics or qualities, unexpected messages and meanings, fruitful lines of enquiry, or possible foci for deeper study (Arksey and Knight, 1999). Identifying categories from the actual interview data was particularly important as Radnor (1994) finds that one of the most important products of categorisation is a category set which is conceptually and empirically “grounded” in the data, which this method allows for.

Arksey and Knight (1999) identify five criteria for checking the categories chosen are reflective of the whole data gathered and suitable to proceed to the analysis and these were checked for both the airline and airport interviews.

- Do the categories cover all of the data that are relevant to the research aims?
- Are new categories needed?
- Do existing categories need to be split into sub-categories?
- Are there too many categories with segments being given more than one code?
- Are there categories that have been suggested by the literature which are not being used?
Once categories were assigned and it was checked that all of the major points were covered by a category, sections of speech were coded according to the categories and cut out of the transcript and pasted with similar items under a category heading, with duplicates being made in the rare circumstances where text was relevant to more than one category. Data was categorised manually, allowing greater flexibility in assigning specific words, sentences and paragraphs (Dey, 1993).

The categorisation of the interview data allowed for ease of access to excerpts from various transcripts relating to a particular topic and enabled common themes and responses between interviews to be effectively identified, allowing conclusions to be drawn and common explanations to previous findings to be identified.

4.6.3 Case Study Method

A single case study was conducted focusing on an airport's efforts to attract freighter operators and the factors and processes involved with one airline choosing this airport. The specific case study question for this method to address is "What are the mechanisms and policies that Dallas/Fort Worth airport has put in place in order to create an environment which would attract non-integrated freighter operators and what are the reasons and processes involved in China Cargo Airlines deciding to operate there?" This was achieved using interviews and the analysis of documentary evidence. This section explains how and why the specific case study was chosen, the mechanics of collecting the data and the way in which the case was analysed.

4.6.3.1 Choosing the Case Study

Given that a single case study was utilised for this research, it was extremely important that the chosen case effectively highlights the processes involved with an airline establishing a service at an airport and also capture the airport's efforts to attract this, and other carriers. The case was therefore chosen with great care.
First a decision was taken to identify the airport as the basis for the study and it was decided that the airport must possess the following criteria and therefore it was important to have control over this:

- Show a willingness to attract non-integrated freighter operators;
- Have a number of freighter operators at the airport;
- Have recently attracted new freighter services;
- Operate in a competitive environment with other nearby airports.

Selecting the freighter operator first might have restricted the opportunity to focus on airports matching the above criteria depending on their route network, potentially jeopardising the quality of the case.

As with the interviews the survey respondents who indicated they were willing to participate further in the research were first evaluated for the case study as they had demonstrated a willing to attract freighter operators. Here the responses to the question of whether they had recently gained any new operators was of particular interest.

The primary concern with the selection of an airport was that there would be an airline serving the airport, ideally a recently established operator, that would be willing to participate in the research. To this end the specific airlines at the airports under consideration were evaluated before a decision on the airport was made and these were checked against a list of airlines that responded to the survey questionnaire as a demonstration of at least some willingness to participate in this research. However no carriers were approached before gaining agreement from the airport to participate in the research.

Through the evaluation of survey responses and due to exposure in air cargo industry publications for their success in attracting freighter operators, an airport was chosen meeting all the criteria as described below.
Airport Chosen: Dallas Fort Worth Airport, Texas, USA

Main reasons for choice of case: A major passenger and cargo airport DFW is the world’s 6th busiest passenger airport and is ranked 25th in terms of total cargo handled and grew its cargo business by 12.5% in 2004 (DFW Airport, 2004). The airport has a wide selection of freighter operators serving the airport and was very successful in adding to its portfolio in 2004. Unlike many other major airports it is not constrained in its development being the third largest airport by land mass in the world with 8 runways. The airport is dynamic in marketing itself to freighter operators and competes with a number of higher profile airports such as Houston, Chicago O’Hare and Atlanta and has often been cited as an example of good marketing practice in industry publications (e.g. ACN, 2004) and received the highest score in the 2006 Air Cargo World ‘Air Cargo Excellence’ survey (Air Cargo World, 2006).

Interviewee: Assistant Vice President Marketing

This interviewee’s role within the company is to market the airport to potential new operators. The majority of this is focused on developing air cargo services and this person travels extensively to meet with potential cargo airlines and is involved in negotiations from the start to the end of the process. As the airport’s most senior air cargo-related employee with such a comprehensive involvement in air services development, and with a marketing-led focus, this person can contribute a great deal to the case.

Interview location: Dallas Fort Worth Airport

Duration: 90 minutes

Once the airport had been decided upon a profile of each incumbent carrier was produced, including information such as length of service at the airport, frequency of service, origin and destination(s) of the service, and a list of contact names. From this profile the first priority was to select a carrier that was a relatively recent addition to the airport. This was important as it increased the chances of the original decision-makers still being in their original post within the company, and not having moved on which would have made access particularly difficult. Furthermore, and perhaps most importantly with new additions the information will still be fresh in the respondent’s mind and any relevant documentation is more likely to still be available. Information
on frequency and origin and destinations was used to evaluate the scale of the presence at the airport.

Dallas-Fort Worth Airport had been successful in attracting two new freighter operators during 2004 and both of these airlines were contacted in the hope of utilizing information from two airline sources, although only one of them agreed to participate in the research and was therefore selected.

Airline Chosen: China Cargo Airlines

**Main reasons for choice of case:** This Asia based airline began serving Dallas-Fort Worth Airport in 2004 and therefore the primary reason in choosing this case was that the relevant information would be fresh and therefore more likely accurate. The airline itself is a passenger and cargo combination carrier which adds a new dimension to the research with regards to identifying the influence of the locations of its passenger services.

**Interviewee:** Regional Manager, North America

This interviewee was heavily involved in the selection of DFW Airport as the airline's senior cargo representative in North America and therefore had a significant amount of contact with the airport, feeding information back to the airlines head office and senior management. Within the airline there was no other individual practically involved in the whole selection process in this case and this contact is therefore in the best position to provide accurate and relevant information for this case.

**Interview location:** Airline office, Chicago O'hare Airport

**Duration:** 60 minutes

**4.6.3.2 Data Collection Methods**

**Interviews**

For the airport interview a visit was made to the airport site to interview the Assistant Vice President of Marketing. This interview lasted approximately 90 minutes and was recorded for analysis purposes. By visiting the airport there was an opportunity to view the cargo facilities at first hand which was valuable evidence to accompany
what was said in the interviews. The airline interview was approximately 60 minutes in duration.

As with the general interviews, the case study interviews utilised an interview guide to indicate the questions and their ideal sequence in the interview. Whilst the questions remained of an open design and the order of the questions remained flexible, there was an added degree of structure to the case study interview as it is focused not only on the more general aspects of air services development but on the specifics of the commencement of service by China Cargo Airlines. This added structure came from ensuring that a number of key questions were posed as written in the interview guide, although a number of other questions were flexible depending on the responses as with the general interviews.

Alternative “Evidence”

Yin (1994) stipulates as an overriding principle of case study research the use of multiple sources of evidence. Having conducted interviews with the airline and airport, alternative sources of information were sought. Gillham (2000) identifies six key types of evidence to support case study arguments:

- Documents
- Records
- Interviews
- Detached observation
- Participant observation
- Physical artefacts

Of these six types of evidence, four were used for this research, namely interviews described above, detached observation through a visit to Dallas-Fort Worth Airport and tour of the cargo facilities, documents and records. Using these different approaches is advantageous as any findings or conclusion in a case study is likely to
be much more convincing and accurate if it is based on several different sources of information (Yin, 1994).

One advantage of completing a case study of an airport in the United States is the strong public information provision ethos of major companies which meant that a number of supporting documents were available from DFW Airport. Conversely there was no supporting evidence provided by the airline. Specific financial details of operating to DFW Airport compared with other airports were requested but given their sensitive nature were not supplied. From the airline these were the only documents or records sought. A summary of the documents and records obtained and used as part of the case study along with their function and original source are highlighted in table 4.8.

<table>
<thead>
<tr>
<th>Description of Evidence</th>
<th>Function of Evidence</th>
<th>Source of Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airport Master Plan</td>
<td>Assess the priority afforded to cargo from a strategic perspective</td>
<td>DFW Airport Website</td>
</tr>
<tr>
<td>List of Tariffs</td>
<td>Compare cargo tariffs &amp; structure with other airports</td>
<td>Direct from Airport Interviewee</td>
</tr>
<tr>
<td>PowerPoint Presentation</td>
<td>Provides insight into marketing approach in meetings with airlines</td>
<td>Direct from Airport Interviewee</td>
</tr>
<tr>
<td>Tailored Marketing Literature</td>
<td>Provides insight into specific marketing to China Cargo Airlines</td>
<td>Direct from Airport Interviewee</td>
</tr>
<tr>
<td>General Marketing Literature</td>
<td>Shows the key points on which the airport is selling itself.</td>
<td>Direct from Airport Interviewee</td>
</tr>
<tr>
<td>Press Releases</td>
<td>Provides extra information &amp; comment on China Cargo Airlines’ decision</td>
<td>Airport &amp; Airline Websites</td>
</tr>
<tr>
<td>Magazine Articles</td>
<td>Provides extra information on airport cargo strategy &amp; comment on specific case.</td>
<td>General reading of industry serials</td>
</tr>
</tbody>
</table>

Table 4.8: Documents and records used as part of the case study together with their function and source.
4.6.3.3 Case Study Analysis

The case study interviews were analysed in the same way as with the general interviews by first producing transcripts from the recording and then identifying categories into which the significant information were placed using content analysis. Section 4.6.2.3 should therefore be consulted for the detailed method of analysis.

The documents and records were analysed in a similar fashion through the use of content analysis where key themes were searched and then marked for extraction under the categories identified from the analysis of the interviews. The categories are manifested in the case study chapter headings (see chapter 7) with the documents and records being further used to provide a background and introduction to the case.

4.7 Chapter Summary

This chapter has addressed and documented the selection and execution of three methods to address the research objectives and has highlighted the fundamental epistemological beliefs behind the research. The relativist-interpretivist approach adopted and sympathy for the qualitative school of research led to the selection of interviews and a case study as the means to provide detailed causal evidence with regards to establishing conclusions for the research. However this approach did not close the door to the use of more quantitative techniques and two international surveys were deemed necessary to provide external validity to the research. This three pronged approach was found to be necessary in order to fully meet the objectives of the research and ensure the findings are robust. The mechanics of undertaking the chosen methods and analysing the results were also described so as to ensure that the research can be repeated or developed if necessary in the future. So too was the logic behind the selection of organisations who provided the raw information to generate findings and the specific airlines and airports were chosen to ensure this raw information was of the highest quality. The following three chapters are a manifestation of the methods described in this chapter and the quality of the results presented in these chapters will be greatly enhanced by the carefully considered and designed methodology highlighted in this chapter.
5. Survey Findings

5.1 Introduction

This chapter presents the findings from the first stage of the methodology described in chapter 4, namely the two postal surveys sent to non-integrated cargo airlines and airports. This chapter therefore has two distinct sections. First the findings of the survey sent to 118 non-integrated cargo airlines are presented from which 39 responses (33% response rate) were received. This survey focuses on the potential location factors highlighted in chapters 2 and 3, identifying their true influence to freighter operators. The output from this section therefore is an investigation of which factors influence location in order to provide a greater focus for the interviews. Then in section 5.3 the findings from the airport survey are presented, from which 40 responses were received from a sample of 70, representing a 57% response rate. This survey focuses on the airport’s experience of attracting freighter operators, from which there was less information forthcoming from the literature, and is an indicator of where perhaps airports need to improve in this regard. This chapter focuses on the findings themselves with the discussion and interpretation of these findings relating to the overall thesis, along with the findings from the other methods, analysed in chapter 8.
Chapter 5 - Survey Findings

5.2 Airline Survey

5.2.1 Introduction to Airline Survey

In order for the survey to make generalisations it must be representative of the population surveyed and prior to data analysis comparisons were made between the characteristics of those airlines the survey was sent to as a whole and those who replied. The respondent airlines and the airlines in the sample were classified into seven geographic regions and the profile of the respondents was not found to be significantly different from the profile for the entire population (see chapter 4, table 4.4). The profile of the respondent airlines in terms of their operational characteristics (whether they predominantly operate domestic, regional or long haul services) was also compared with the population, and again these were not significantly different (see chapter 4, table 4.5).

This section presents the findings from the airline survey and covers all of the main themes of the literature and theory chapters, including the influence of other companies such as freight forwarders and competing airlines, as well as the impact of airport marketing and the limitations imposed on cargo airlines when locating freighter services. The survey itself can be found in appendix A.

5.2.2 Rankings for airport choice factors

In order to determine the relative prevalence of a variety of potential airport choice factors, the airline survey asked airline managers how important they felt a series of factors were in determining their location. They were asked to rate a total of 16 factors 1-5, with 5 indicating the highest importance. The mean average of these scores was then taken and factors were ranked based on this score. These rankings are presented in table 5.1, which as well as the mean average level of importance, also displays the percentages of respondents who attributed the relevant level of importance to each factor. Airlines were asked about freight forwarders separately in

\[1\] An abridged version of this section focusing on the findings of the airline survey was published in the Journal of Air Transport Management (see Gardiner et al., 2005b).
order to elicit exactly why they deemed forwarders to be of the level of importance they did, although their responses have been included in table 5.1 for ease of comparison with other factors and therefore the table contains rankings for a total of 17 factors identified from chapters 2 and 3.

All factors bar one gained an average rating of 3 or greater indicating the factors were at least ‘somewhat important’. This provided empirical confirmation of what had been suggested from the literature and theory that these factors were considerations for cargo airlines when locating freighter services. What table 5.1 provides is an indication of the level of importance of each factor and how they are viewed in relation to one another.

<table>
<thead>
<tr>
<th>Factor</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Night operations</td>
<td>0%</td>
<td>5%</td>
<td>13%</td>
<td>33%</td>
<td>49%</td>
<td>4.26</td>
</tr>
<tr>
<td>Minimise overall costs</td>
<td>3%</td>
<td>8%</td>
<td>8%</td>
<td>35%</td>
<td>46%</td>
<td>4.15</td>
</tr>
<tr>
<td>Airport cargo reputation</td>
<td>0%</td>
<td>8%</td>
<td>13%</td>
<td>40%</td>
<td>39%</td>
<td>4.10</td>
</tr>
<tr>
<td>Local origin-destination demand</td>
<td>3%</td>
<td>8%</td>
<td>21%</td>
<td>26%</td>
<td>42%</td>
<td>4.00</td>
</tr>
<tr>
<td>Concentration of freight forwarders</td>
<td>3%</td>
<td>5%</td>
<td>18%</td>
<td>40%</td>
<td>33%</td>
<td>3.97</td>
</tr>
<tr>
<td>Airport road access</td>
<td>0%</td>
<td>8%</td>
<td>18%</td>
<td>54%</td>
<td>20%</td>
<td>3.87</td>
</tr>
<tr>
<td>Airport that minimises flying time</td>
<td>3%</td>
<td>0%</td>
<td>28%</td>
<td>46%</td>
<td>23%</td>
<td>3.87</td>
</tr>
<tr>
<td>Customs clearance times</td>
<td>0%</td>
<td>8%</td>
<td>26%</td>
<td>38%</td>
<td>28%</td>
<td>3.87</td>
</tr>
<tr>
<td>Financial incentive from the airport</td>
<td>3%</td>
<td>8%</td>
<td>15%</td>
<td>51%</td>
<td>23%</td>
<td>3.85</td>
</tr>
<tr>
<td>Trucking time to main markets</td>
<td>3%</td>
<td>13%</td>
<td>20%</td>
<td>31%</td>
<td>33%</td>
<td>3.79</td>
</tr>
<tr>
<td>Trucking costs to main markets</td>
<td>5%</td>
<td>10%</td>
<td>18%</td>
<td>44%</td>
<td>23%</td>
<td>3.69</td>
</tr>
<tr>
<td>Average delay per aircraft movement</td>
<td>0%</td>
<td>10%</td>
<td>26%</td>
<td>51%</td>
<td>13%</td>
<td>3.67</td>
</tr>
<tr>
<td>Labour cost</td>
<td>3%</td>
<td>15%</td>
<td>18%</td>
<td>51%</td>
<td>13%</td>
<td>3.56</td>
</tr>
<tr>
<td>Labour availability</td>
<td>0%</td>
<td>16%</td>
<td>33%</td>
<td>41%</td>
<td>10%</td>
<td>3.46</td>
</tr>
<tr>
<td>Airport weather record</td>
<td>0%</td>
<td>18%</td>
<td>31%</td>
<td>41%</td>
<td>10%</td>
<td>3.44</td>
</tr>
<tr>
<td>The need to locate at a major airport</td>
<td>5%</td>
<td>21%</td>
<td>38%</td>
<td>23%</td>
<td>13%</td>
<td>3.18</td>
</tr>
<tr>
<td>Availability of intermodal facilities</td>
<td>16%</td>
<td>33%</td>
<td>33%</td>
<td>13%</td>
<td>5%</td>
<td>2.59</td>
</tr>
</tbody>
</table>

* Scores range from 1 (not at all important) to 5 (extremely important)

Table 5.1: Airport choice factors and their relative importance
5.2.2.1 Night Operations

Of the factors in table 5.1, it was the ability to operate into an airport at night that was the most important with a mean average score of 4.26 (out of a maximum of 5). As table 5.1 shows, almost half found this “extremely important”, notwithstanding the suggestion in chapter 2 that non-integrated carriers typically operate in the day time. It was the North American and European carriers most concerned with this issue with 83% and 64% respectively finding this to be of the highest importance.

5.2.2.2 Cost and Speed

Of the factors that airports themselves can influence, it was the costs of operating to an airport that was most important with a mean score of 4.15. Cost minimisation was found to be important or extremely important irrespective of geography. 74% of airlines (equating to 29 responses) surveyed found financial incentives to be important in influencing airport choice and indeed 87% of the respondents reported that they had received financial support in order to start new services. The average percentage of overall costs attributed to airport user charges (of those surveyed) was 7.8% and whilst this may not appear noteworthy, it must be considered that the aircraft costs (e.g. lease rates etc.) are constant, regardless of which airport is operated to. This leaves the airport landing and handling charges as the largest variable costs. 74% of airlines found it important to receive some kind of financial incentive (e.g. reduction in landing charge) from airports.

It was significant that cost was found to be more important than the speed at which cargo moves through the airport, especially given that speed is the product of air freight for which shippers pay a significant premium. Aircraft delays for example were seen as “extremely important” by 13% of respondents, as opposed to 46% for costs and had a much lower mean of 3.67. Customs clearance times were also lower on the importance scale with a mean of 3.87. The quality of road access is another factor related to the speed at which cargo moves from A to B. Whilst still viewed as important with a mean of 3.87, it confirms that the overall balance between lower costs and faster speeds, cost is a more significant location determinant.
Chapter 5 - Survey Findings

Airport access by forms of transportation other than road through intermodal facilities was seen as the least important of all the factors listed. For Asia and Pacific carriers however this was more important, these airlines giving intermodal facilities a mean score of 3.56, versus just 2.59 for the whole population. This is potentially due to a greater use of aircraft to ship transfers in this region.

In terms of the balance between the flying time (and therefore cost) and the trucking time and cost, cargo airlines are more sensitive to flying time increases as 27 carriers (69%) felt it important that they operate into an airport whose location minimises flying time from the origin, whereas according to the findings in table 5.1, they were less sensitive to longer trucking sectors. This suggests that an airport within a particular market that is situated closer to the origin of a route would be seen as attractive for a cargo airline as it reduces the flying portion of the journey (which would appear to incur greater cost) at the expense of longer road freight sectors (which would appear to incur less cost) to reach the centre of the market.

5.2.2.3 Geography and Regional Issues

The origin-destination demand was the fourth most important factor. Upon closer examination however it was found that the carriers operating long haul services were finding this less important as their market is much wider than that of a regional or domestic carrier. For example an Asian airline operating a freighter into Manchester, UK would most likely consider their market as the whole of the UK, as opposed to an airline operating flights to Manchester from Edinburgh which would consider much more closely the immediate demand in that city. When cross tabulating the data this becomes evident with only 37% of long haul carriers giving O-D demand a score of 5, compared with 45% and 60% for regional and domestic carriers respectively.

Another factor related to the geography of an airport identified in chapter 2, was labour availability and cost. The literary sources mentioning this factor were concerned with airlines choosing hub airports and its inclusion in the airline survey was as a means to test whether labour was also an important factor for non-hub operations. From the survey labour availability was found to be one of the least
important factors, although labour cost was deemed more important for the small number of workers that a non-hub operation would initially require. The weather record of an airport was also found to be of relatively little importance compared with other factors with a mean score in table 5.1 of 3.44.

5.2.2.4 Airport Characteristics

The importance placed on the reputation and experience of the airport for handling freighter flights was found to be particularly important, suggesting that cargo airlines do take into account the experiences of other operators in their location decisions. With a mean of 4.10 and with 31 respondents (79%) finding this to be important, it was the third ranked of all the factors, demonstrating the importance of experience and certainty when choosing an airport, particularly as freighter operators often feel discrimination compared with passenger operations (see section 5.2.6.2).

This reputation for handling cargo flights does not have to relate to a major airport however, as the need to locate at a major airport was one of the lowest ranked factors with only 14 respondents finding operating to such an airport important.

5.2.3 The influence of freight forwarders

Of the freighter operators surveyed, 33% found having a concentration of freight forwarders at an airport they were considering using to be "extremely important" to their location decision with a further 40% finding this "important" (figure 5.1). This was in stark contrast to the combined 9% who found this "unimportant" or "not at all important" (18% were neutral). As table 5.1 shows, having a concentration of freight forwarders at an airport was considered to be of high importance in relation to other factors, therefore suggesting that this is a major factor for this research.
Cross-tabulating the above results, carriers based in the Asia/Pacific region found freight forwarders most important for their location decisions – 9 out of 11 of the carriers from this region found the presence of forwarders either “important” or “extremely important”. By contrast half of the carriers based in North America found forwarders either “unimportant” or “not at all important” to their location decisions. A possible explanation for this finding is that it is the long haul carriers that appear most enthusiastic about forwarders with 40% of carriers finding the presence of forwarders “extremely important” and a further 40% finding this “important”. The regional and domestic carriers particularly were much less enthusiastic, and 4 out of 5 domestic carriers surveyed operate in North America.

Survey respondents were asked to indicate why they felt forwarders to be as important as they indicated, in order to gain a greater insight into this factor. There were a variety of reasons given as to why the presence of freight forwarders was so important. One of the larger long haul carriers commented that as all their cargo comes through freight forwarders their location plays a crucial role in the airline’s location. Others mentioned loyalty to a certain number of forwarders, whose location would again influence the carrier’s decision. Another respondent exclaimed “they’re our customers – you bet they’re important!”
Having forwarders on site was highlighted as important by a number of carriers because it assists with daily interactions by allowing airlines and forwarders to meet face to face with relative frequency and ease. It was also highlighted that a strong concentration of forwarders at an airport suggests a high volume of cargo in that area. Other airlines however played down the importance of having forwarders on the airport site, providing they were within an acceptable distance of the airport. By contrast one airline operating domestically within the US found that forwarders pay little attention to domestic air cargo and therefore didn’t feel it important to have them at the airport site, suggesting why such carriers overall indicated little importance for this factor compared with the long haul airlines.

5.2.4 The influence of other airlines

The influence of other airlines, a factor that has a strong grounding in agglomeration theory was explored in the airline survey, particularly with regards to the influence of alliance partner airlines, competing airlines and passenger services where the airline operates as a combination carrier.

5.2.4.1 Airline Alliances

Just over half of the freighter operators surveyed (54%) were involved in a strategic partnership with another cargo airline, and of these 65% claimed to have been influenced at some time in the past by their partners when choosing an airport. This is important as it provides a partial explanation as to why the airports with existing cargo traffic seem to be favoured ahead of secondary airports as described in chapter 2. The main reasons given for this partner airline influence was to offer a seamless connecting service for transit cargo, allowing carriers to gain wider network coverage from one location and also to avail of the benefits of joint marketing to help both carriers establish a presence at the airport.
5.2.4.2 Competing Airlines

Freighter operators were asked what extent the airport chosen by a competitor operating in the same market had on their own decision of which airport to operate to in that region. No airlines claimed that the location of a competitor would totally influence their decision, yet (as figure 5.2 shows) only 4 respondents thought this would have no influence at all, clearly indicating that competitors are at least a consideration for freighter operators when locating new services, especially as 11 respondents (29%) indicated that the location of competitors has a significant influence.

![Figure 5.2: The level of influence competing carriers have on a cargo airline's choice of airport](image)

When the size of the freighter operators were cross tabulated with the responses to this question it was found that the smaller carriers were more influenced by the actions of their competitors than the larger carriers with 42% of the former stating that they would be significantly influenced by competitors. This could be explained by their lesser ability to overcome competition from a large carrier and subsequent tendency to operate in niche markets.
5.2.4.3 Passenger Airlines

Of the airlines surveyed 23 were combination carriers, operating a fleet of passenger aircraft as well as pure freighters. These carriers were asked how the location of their passenger services affects their choice of airport for freighter services. 12 of these carriers claimed that there is no influence from the passenger operations when it comes to locating freighter services. The other 11 however endeavour to co-locate their passenger and cargo services when operating in the same market, although half of these claimed to have found difficulty in doing this.

Whether the freighter operator was a combination carrier or not had a pronounced impact on a number of other responses. For example combination carriers found it significantly more important to locate at a major airport, with half finding this important or very important as opposed to just 3 pure freighter operators. This indicates that airports to which the passenger arm of a combination carrier operates, have an increased chance of attracting their freighter services.

5.2.5 The impact of legislation

5.2.5.1 Air Service Agreements

The survey confirmed the disruptive impact legislation has on freighter operators’ location decisions, with 72% of respondents claiming that Air Service Agreements (ASAs) had prevented them from operating to an airport they would have otherwise chosen; whilst in the Asia/Pacific and Middle East regions (where most freighter routes are international) all respondents felt they had been restricted by ASAs. Given that the vast majority of long haul flights are international and subject to such regulation, 14 out of the 16 long haul carriers surveyed claimed to have been affected by ASAs in the past, compared with 12 out of 18 of regional carriers.

As figure 5.3 shows, the majority of carriers find the current practice of combining cargo and passenger rights (which restricts cargo airlines to agreements made with passenger carriers in mind) restrictive to some degree, with 33% finding the current
policy "restrictive" and a further 8% finding it "extremely restrictive". The restriction is more telling if the domestic carriers are not considered, and for long haul carriers it was a very important issue, with 11 out of 16 (69%) believing them to be either "restrictive" or "extremely restrictive".

Freighter operators were further asked whether they would make changes to their route network and airports served if traffic rights for cargo were separated from passenger rights. 64% claimed they would make changes should more freedom be granted to freighter operators, with European carriers the most likely.

![Figure 5.3: How restrictive the different types of carriers found the combination of passenger and cargo rights.](image)

**Figure 5.3:** How restrictive the different types of carriers found the combination of passenger and cargo rights.

### 5.2.5.2 Government influence

Government influence in the location of freighter operators was found to be somewhat prevalent. Whilst the effect was limited in the rest of the world, half of the Asia/Pacific carriers claimed that government support had had a significant influence on their past location decisions. This may be as a result of the sheer number of
government supported airport infrastructure projects in Asia and a desire to see these facilities used.

Overall there was a somewhat equal split between those carriers that had been influenced by local or national government to a high degree and those that had not. Noteworthy is that only 4 out of 39 respondents claimed that support from local or regional government has had no previous influence on their choice of airport.

Table 5.2 shows the responses for three different regions to the question of government influence: Asia/Pacific, North America and Europe.

In contrast to the Asia/Pacific region, 4 out of 6 North American airlines found government support to have had minimal influence on their location decisions, whilst it seems the Europeans have been least influenced by government support. It must be noted however that this question is particularly contentious, especially in Europe following recent legal challenges to such support which may have influenced the data for this region.

<table>
<thead>
<tr>
<th>All Regions</th>
<th>No influence</th>
<th>Minimal influence</th>
<th>Some influence</th>
<th>Significant influence</th>
<th>Total influence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asia/Pacific</td>
<td>0</td>
<td>1</td>
<td>5</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>North America</td>
<td>0</td>
<td>4</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Europe</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>4</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 5.2: The influence of government support on freighter operator location decisions showing number of respondents.

5.2.6 The airline-airport relationship

5.2.6.1 Effectiveness of airport marketing

The majority of respondents were unconvinced as to the effectiveness of airport marketing in terms of influencing their airport choice, as figure 5.4 shows, with 45%
believing it to be “neither effective nor ineffective”, although 39% had found it “somewhat effective”.

![Pie Chart](image)

**Figure 5.4:** How effective respondents felt airport marketing was in attracting new carriers.

When asked however whether such marketing had attracted the freighter operators to an airport that they may not have otherwise considered, a quarter said that this had happened, suggesting that in certain circumstances marketing can be very effective. What the freighter operators feel airport marketing does in the main though is demonstrate that they are committed to cargo services. This is important as one airline manager put it, “*most airports know very little about cargo*”.

This validates the strength of the airport cargo reputation shown in table 5.1. A further reason why marketing had attracted some airlines is that is can simply promote knowledge of previously unknown regions and at least open the door for discussions.

### 5.2.6.2 Airport priority

The majority of the airports worldwide serve predominantly passenger traffic with cargo as a secondary focus. The freighter operators surveyed were asked whether they felt any discrimination from airports as opposed to passenger airlines and the majority felt they had been given lower priority in certain areas.
64% of those surveyed felt cargo airlines get a lower priority at airports in general compared with passenger airlines. This was particularly the case for European carriers with their congested main airports, with 70% perceiving discrimination, whilst 100% of the domestic-focused carriers felt this.

Those airlines that also operate passenger aircraft were less concerned about airports giving passenger operators priority. Of the carriers that only operate freighter aircraft, 80% thought airports were giving freighter services a lower priority. However of the combination carriers this figure was down to 50%.

There were five primary reasons given as to why carriers felt discrimination as highlighted in table 5.3. 19 respondents gave a reason for this question and slot allocation was the primary issue, with 37% of the respondents mentioning this.

<table>
<thead>
<tr>
<th>Reason</th>
<th>Number of mentions</th>
<th>% of carriers mentioned</th>
<th>Number of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slot Allocation</td>
<td>7</td>
<td>37%</td>
<td></td>
</tr>
<tr>
<td>Lower priority handling</td>
<td>6</td>
<td>32%</td>
<td></td>
</tr>
<tr>
<td>Inferior facilities</td>
<td>6</td>
<td>32%</td>
<td></td>
</tr>
<tr>
<td>Legislative restrictions</td>
<td>6</td>
<td>32%</td>
<td></td>
</tr>
<tr>
<td>Customer service neglected</td>
<td>4</td>
<td>21%</td>
<td></td>
</tr>
</tbody>
</table>

Table 5.3: Ways in which cargo airlines feel they are given lower priority

5.2.6.3 Airport improvements

Given the general feeling of discrimination felt by cargo airlines, the survey asked what airports can do to attract them which brought about a number of workable suggestions – some more practical than others.

When asked what airports can do to attract cargo traffic, the 36 freighter operators that responded wanted above all else lower airport fees in order to cut the costs of their operation, whilst some mentioned a simplification to the charging structure as a
further improvement in this area. It was also indicated that cargo airlines want improvements to facilities such as transit sheds at many airports. Table 5.4 highlights the most common suggestions made.

<table>
<thead>
<tr>
<th>What can airports do to attract your business?</th>
<th>No. of carriers mentioned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduce fees for landing, handling and fuel</td>
<td>19</td>
</tr>
<tr>
<td>Improve facilities and infrastructure</td>
<td>11</td>
</tr>
<tr>
<td>Work with businesses to increase demand</td>
<td>9</td>
</tr>
<tr>
<td>Improve handling efficiency</td>
<td>8</td>
</tr>
<tr>
<td>Give specific needs of cargo airlines more attention</td>
<td>6</td>
</tr>
<tr>
<td>Improve ground transport facilities</td>
<td>5</td>
</tr>
<tr>
<td>Give cargo equal priority to passengers</td>
<td>2</td>
</tr>
<tr>
<td>Improve labour quality</td>
<td>2</td>
</tr>
<tr>
<td>Simplify charging structure</td>
<td>1</td>
</tr>
<tr>
<td>Make convenient slots available for cargo</td>
<td>1</td>
</tr>
<tr>
<td>Improve customs efficiency</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 5.4: What freighter operators want airports to improve to attract their business

Of most note is that a quarter of those surveyed wanted airports to be more pro-active in terms of working with local industry as well as forwarders to help sustain a greater demand for cargo services. It was felt by the airlines that many areas could sustain extra cargo services if only local industry was fully aware of the benefits of using that airport or their interest was effectively transmitted to the airlines via the airport during negotiations.

Other notable suggestions as to how airports can attract cargo business included an improvement to the efficiency of cargo handling and allowing competition in handling to drive down charges. Improvements to ground transport facilities, including road access for trucks, and improvements to labour quality and the efficiency of customs on the airport site, were also viewed as developments that could help an airport establish a freighter presence, particularly if such infrastructure was underdeveloped at an airport.
5.2.7 Why freighter operators relocate

As well as looking at what makes a particular airport attractive to freighter operators, they were also asked what had made them move away from airports in the past if they had relocated a service.

Of the freighter operators surveyed, 16 (42%) had relocated a cargo service from one airport in a region to another in the same region in the past two years. The most common reason for this, as table 5.5 reveals, was demands from a primary customer to locate the service elsewhere. This supports the earlier finding that airports need to engage with the major shippers and forwarders in order to maximise the potential of the demand that exists in the region of the airport.

<table>
<thead>
<tr>
<th>Why have you relocated?</th>
<th>No. of carriers mentioned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer demand</td>
<td>11</td>
</tr>
<tr>
<td>Better facilities elsewhere</td>
<td>10</td>
</tr>
<tr>
<td>Lower charges elsewhere</td>
<td>8</td>
</tr>
<tr>
<td>Environmental restrictions</td>
<td>4</td>
</tr>
<tr>
<td>Increase in charges</td>
<td>2</td>
</tr>
<tr>
<td>More attention to cargo at other airport</td>
<td>1</td>
</tr>
<tr>
<td>More business potential in a new region</td>
<td>1</td>
</tr>
<tr>
<td>Pressure from government to move to another airport</td>
<td>1</td>
</tr>
<tr>
<td>Lack of capacity for expansion</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 5.5: Reasons for freighter operators' airport relocations

When the decision is in the freighter operator's hands, the quality of facilities was the most significant factor leading to relocation, with 60% of the carriers that had relocated stating this as a reason for doing so. This is significant as it is something airports can directly improve to attract airlines. Airport user charges were also included as an important reason for relocations suggesting that keeping these low is important for airports. Another significant factor - environmental restrictions - were
cited as a main reason by 4 respondents, and this demonstrates how such restrictions are increasingly leading to a redistribution of cargo traffic to secondary airports.

5.2.8 The most important aspects of freighter operator locations

Freighter operators were asked to state the three most important aspects that they will consider when next choosing an airport, assuming an absence of regulatory restrictions. Table 5.6 displays the three most common responses. The table shows both the percentage of respondents that named each factor among their top three, and also the percentage that named each factor in each specific position.

<table>
<thead>
<tr>
<th>Position</th>
<th>Response</th>
<th>% in position</th>
<th>% overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Demand for cargo</td>
<td>30%</td>
<td>48%</td>
</tr>
<tr>
<td>2</td>
<td>Airport landing and handling charges</td>
<td>25%</td>
<td>56%</td>
</tr>
<tr>
<td>3</td>
<td>Quality and availability of cargo facilities</td>
<td>21%</td>
<td>28%</td>
</tr>
</tbody>
</table>

Table 5.6: The three most important aspects for freighter operators when next choosing an airport.

From the responses 30% named demand for cargo as the most important aspect, whilst 48% placing it in one of the top three positions. More respondents (56%) actually named airport landing and handling charges in the top three although mostly in the lower positions, further suggesting that this was clearly important, but perhaps not the most important factor. In third position was the quality and availability of cargo facilities, which throughout the survey has shown itself to be an important factor, over and above the level suggested in the literature.

Looking at regional differences, the top three presented in table 5.6 was the same for carriers based in all regions with a few minor exceptions, these being that charges were seen as most important in Africa, whilst in Europe absence of restrictions was in third place ahead of cargo facilities, reflecting the restrictive regime in this region.
Outside of the three most important aspects, absence of restrictions was the most frequent response with 27% mentioning this in one of the top three positions. Other notable aspects that the freighter operators found important were the service quality from the airport and handling agent, airport development support and incentives, and ground transportation and distribution facilities.

5.2.9 The process of location decisions

One of the key outcomes from the literature review was the suggestion of a common process which freighter operators experience when choosing an airport. This was included in the survey to investigate whether respondents agreed that this was a common manifestation when choosing an airport. 89% of respondents agreed that when evaluating new routes they first assess the region to which they want to operate, before assessing the restrictions in place at potential airports and only then evaluating the individual attributes of the airport. Those carriers that did not agree suggested that commercial issues and market requirements led to the decision to establish a route and this was fundamental in choosing an airport. More than anything this serves to strengthen the evidence that establishing a region based on demand is the first priority for any carrier.
5.3 Airport Survey

5.3.1 Introduction to Airport Survey

There were 40 responses to the airport survey from a sample of TIACA member airports. The exact make up of these respondents in terms of region, and cargo handled can be found in chapter 4, tables 4.6 and 4.7 respectively. In terms of region the respondents are weighted heavily in favour of North American and European airports, reflecting TIACA membership in general. Therefore comparisons made in this summary refer mainly to these two regions.

This section presents the findings from the airport survey and covers many of the same issues as for the airline survey from the airport perspective. In particular the survey covers what the airports feel are important factors for freighter operators in order to gauge the level of understanding airports have for the needs of airlines, and also the marketing methods they use to attract them for the same reason. The prevalence of restrictions on airport is also analysed. The survey itself can be found in appendix D.

5.3.2 Airport’s view of airline choice factors

In order to make a comparison between the level of importance airlines placed on the airport choice factors identified in chapters 2 and 3 and the level of importance airports placed on them, airports were asked to rate many of the same factors that were summarised in table 5.1.

Table 5.7 lists the mean average score of importance assigned by airports (with 5 being the most important) for each of the 11 factors relevant for use in the airport survey. The right hand column shows the percentage of respondents that found each particular factor to be either “important” or “extremely important”. The factors are ranked by their mean score. The values in parentheses represent responses from the airport survey for ease of comparison.
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### Table 5.7: How airports view the importance of 11 choice factors vis-à-vis freighter operators' decisions

<table>
<thead>
<tr>
<th>Factor</th>
<th>Not important</th>
<th>Important</th>
<th>Airline Mean</th>
<th>Airport Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost of operating to the airport</td>
<td>0% 8%</td>
<td>8% 38% 46%</td>
<td>(4.15)</td>
<td>4.38</td>
</tr>
<tr>
<td>Quality of road access to the airport</td>
<td>9% 0%</td>
<td>3% 44% 44%</td>
<td>(3.87)</td>
<td>4.10</td>
</tr>
<tr>
<td>Local origin-destination traffic</td>
<td>3% 8%</td>
<td>13% 40% 36%</td>
<td>(4.00)</td>
<td>4.00</td>
</tr>
<tr>
<td>Night operations capability</td>
<td>3% 11%</td>
<td>8% 43% 33%</td>
<td>(4.26)</td>
<td>3.97</td>
</tr>
<tr>
<td>Trucking time to main markets</td>
<td>5% 10%</td>
<td>10% 44% 31%</td>
<td>(3.79)</td>
<td>3.85</td>
</tr>
<tr>
<td>Average delay</td>
<td>0% 11%</td>
<td>24% 38% 27%</td>
<td>(3.67)</td>
<td>3.81</td>
</tr>
<tr>
<td>Airport cargo reputation</td>
<td>3% 18%</td>
<td>18% 33% 31%</td>
<td>(4.10)</td>
<td>3.74</td>
</tr>
<tr>
<td>Customs clearance times</td>
<td>5% 10%</td>
<td>21% 49% 20%</td>
<td>(3.87)</td>
<td>3.72</td>
</tr>
<tr>
<td>Labour availability</td>
<td>0% 16%</td>
<td>26% 45% 13%</td>
<td>(3.46)</td>
<td>3.55</td>
</tr>
<tr>
<td>Financial incentive</td>
<td>5% 18%</td>
<td>33% 23% 26%</td>
<td>(3.85)</td>
<td>3.51</td>
</tr>
<tr>
<td>Availability of intermodal facilities</td>
<td>11% 28%</td>
<td>33% 23% 5%</td>
<td>(2.59)</td>
<td>2.85</td>
</tr>
</tbody>
</table>

* Scores range from 1 (not at all important) to 5 (extremely important)

As table 5.7 shows, airports viewed the costs of operating to an airport as the most important factor for cargo airlines, which is significant in that many airports have the flexibility to lower charges as part of a marketing strategy to attract airlines. The airports surveyed agreed with the freighter operators that this was very important in terms of attracting airlines.

The issue of costs versus speed is a pertinent one, and as was the case when the freighter operators were surveyed, airports thought the cost to airlines was more of an issue for them than factors relating to the expedited movement of cargo through the airport. However the quality of road access was deemed to be very important by airports with a mean of 4.10 indicating their awareness of the need for freighter operators to move cargo in and out of the airport as quickly as possible. They did not however see their average delay data as being as important with only 65% of respondents viewing this as either important or extremely important. With this factor though there was a clear regional split between Europe and North America. The latter felt delays were more important to freighter operators than European airports did, with
17 out of 21 (80%) believing this to be either important or extremely important to freighter operators versus 8 of the 17 European airports. A third of European airports were neutral to this.

Airports viewed origin-destination demand at their airport as very important, as did the airlines surveyed with an equal mean average score of 4.00. This acknowledges the importance of this factor for airlines in determining where they locate based on likely loads on their flights.

Origin-destination demand is largely out of the control of airports, as is the fourth ranked factor, night time operations, restrictions on which tend to be imposed rather than agreed. North American airports thought night flights were more important to freighter operators than did European airports, with 85% feeling this was important or extremely important, versus 70% for European airports, possibly as a result of many of these airports being more restricted in this area.

Of particular interest was that many airports saw their reputation for handling freighter flights as less important than did the freighter operators surveyed, who were particularly looking for airports that are enthusiastic about cargo. This has implications for airports from a marketing perspective if they fail to understand exactly how much relevance airlines place on this factor, which appears to be the case. For example airlines gave the airport's cargo reputation an average rating of 4.10, compared with the significantly reduced average of 3.74 attributed to this factor by airports.

5.3.3 The impact of freight forwarders on airport freighter operations

The majority of airports surveyed (30 out of 40) felt the presence of freight forwarders to be extremely important for them to attract non-integrated freighter operators, whilst not a single airport found freight forwarders unimportant. With this in mind, two-thirds of airports had taken measures to attract freight forwarders, these ranging from building new facilities such as transit sheds and offices, to holding regular meetings with the forwarders themselves and making company visits.
However 4 of the 6 largest airports (those which handle more than 1 million tonnes per annum) did not take measures to attract forwarders, in all likelihood because they simply do not need to as their scale means forwarders will be naturally attracted to them. This view is strengthened by the fact that the largest percentage of those that did take measures to attract forwarders were the smaller airports which handle less than 50,000 tonnes per annum. 7 out of 8 of these airports had taken measures to attract forwarders - considerably more than for the larger airports.

5.3.4 The impact of passenger services on airport freighter operations

The balance between passenger and freighter aircraft at an airport and the impact one has on the others operations is particularly pertinent given literature findings such as Hall (2002) and the theory of agglomeration. For freighter operators passenger services can be both positive and negative and this is reflected in the airline survey where 64% felt that airports unduly favour passenger airlines when it comes to priority for slots and services. To confirm this, responses by airports in this survey agreed that passengers are often favoured. 53% of airports said their airports favoured passengers over cargo, compared with 10% who favour cargo services, these being the industrial airports. The remaining 37% claimed they gave passenger and cargo services equal priority.

Freighter operators may however benefit from having wide bodied passenger flights at the same airport, particularly those with their own passenger operations. When the airports were asked to describe what they felt the impact of passenger services were on freighter operations, the greatest proportion (37%) felt that passenger services had no impact, whilst only 11% felt passenger services were negative for cargo operators, as shown in figure 5.5.
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![Pie Chart: Impact of Passenger Services on Cargo](image)

Figure 5.5: The impact of passenger services on cargo

When asked to explain why they felt passenger services had a negative impact, the most frequent response was that passenger operations compete for funds and that they get higher priority on services and space. Another significant response was that an abundance of belly hold capacity negatively affects yields on freighter services, given that passenger operators can offer belly space at lower rates.

29% of respondents however felt that passenger services have a positive impact on freighter services, whilst the remaining 23% felt there was a mix of positive and negative aspects. Of those that felt that passenger services had a positive impact, the main reason given was that the passenger services offered the freighter operators interlining benefits, and for the airport this meant that they could market more cargo destinations and boost the airport’s cargo profile.

5.3.5 The impact of legislation on airport cargo operations

Taking the airports surveyed as a whole, the general consensus was that legislation did not disadvantage airports compared with their closest competitors. However this is clearly a regional issue and respondents were therefore broken down into regions
and then subdivided into countries. By doing this it emerged that airports which border countries with less restrictive regimes were suffering most. For example, Canadian airports in particular felt they had been disadvantaged by legislation, with 86% feeling this to be the case. Conversely only 15% of airports in the USA felt that legislation had disadvantaged them. Airports in Canada close to the US border therefore felt they did not have an equal chance of competing with their US rivals.

Air service agreements were a particular issue for the Canadian airports with 7 out of 8 feeling these restricted their airport from attracting certain freighter operators, compared to just 4 out of 13 in the USA. Figure 5.6 illustrates six restrictions that affect an airport’s ability to attract new freighter services and the percentage of all respondent airports for which these restrictions apply.

Figure 5.6 shows that overall 42% of respondent airports were restricted by air service agreements in their attempts to gain more freighter traffic, often, as many described, due to not being named as points of entry under specific air service agreements. Another common restriction was noise constraints, with 34% having restrictions to this affect in force at their airport. This issue was particularly prominent with European Union airports who described how they were affected by EU directive 92/14, effectively banning stage 2 aircraft from member country’s airports. Contrary

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**Figure 5.6:** The prevalence of 6 common restrictions on airports

![Figure 5.6: The prevalence of 6 common restrictions on airports](image-url)
to findings in chapter 2, relatively few airports surveyed were affected by night curfews, and the same was true of slot restrictions, capacity constraints and traffic distribution rules (TDRs). A further 34% were not affected by any of the restrictions highlighted in figure 5.6.

5.3.6 Airport marketing methods to freighter operators

Incentives such as reduced airport charges for a period of time or support for developing the services operated by airlines are two frequently used methods of marketing an airport to would-be operators. Airports reported that it was relatively common to offer both types of incentive, with 45% of those who responded to this question claiming it was commonplace for them to offer reduced airport charges to new operators, whilst only 20% claimed never to have offered such incentives.

The newer industrial airports with little or no existing cargo services offer financial incentives more frequently – 75% of these airports said it was extremely common to offer incentives. Of those airports for which it is extremely common to offer financial incentives, 50% had gained new services, although the majority of those who had gained new services had not offered reduced charges with any frequency, suggesting the effectiveness of this method may be somewhat limited.

Offering development support such as marketing assistance to the airline to establish its services in a market was more common than charge reductions, with 67% of airports offering such support regularly and only 18% claiming they had never offered such incentives. Contrary to expectation it was the airports that operate predominantly passenger services that were more likely to offer such support. 14 out of the 18 such airports surveyed said it was common or extremely common to offer development support, significantly greater than for any other type of airport.

When asked which factors they thought were important to freighter operators when choosing an airport, the airports surveyed felt financial incentives was one of the least important of the factors presented (refer back to table 5.7). However just under half did think this was either important or extremely important. The airports that felt that
financial incentives were most important were the secondary cargo airports – 5 out of 7 of these felt incentives were important or extremely important versus just 4 out of 11 major passenger and cargo hubs. The majority of the major hubs were neutral in terms of the importance they place on incentives to attract freighter operators.

82% of airports surveyed had a marketing plan aimed at attracting freighter operators and there are a number of differing methods used for this purpose. Table 5.8 summarises some of the most common marketing methods adopted and shows the percentage of airports who said they adopted these methods.

<table>
<thead>
<tr>
<th>Method Used</th>
<th>Number of airports using method (out of 40)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal approaches to cargo airlines</td>
<td>37 (93%)</td>
</tr>
<tr>
<td>Work with freight forwarders</td>
<td>34 (85%)</td>
</tr>
<tr>
<td>Advertising brochures</td>
<td>32 (80%)</td>
</tr>
<tr>
<td>Cargo pages on airport website</td>
<td>28 (70%)</td>
</tr>
<tr>
<td>Work with established shippers</td>
<td>27 (68%)</td>
</tr>
<tr>
<td>Print advertising in industry publications</td>
<td>25 (63%)</td>
</tr>
<tr>
<td>Work with local business community</td>
<td>24 (60%)</td>
</tr>
<tr>
<td>Benchmark other airports</td>
<td>21 (53%)</td>
</tr>
<tr>
<td>Sponsor cargo events</td>
<td>15 (38%)</td>
</tr>
</tbody>
</table>

Table 5.8: Methods used by airports to market themselves to freighter operators

The most popular method adopted to attract new operators was making personal approaches to cargo airlines, with 93% of respondents claiming to do this. Strengthening the importance of freight forwarders highlighted earlier, 85% said they worked with forwarders to develop freighter services at their airport, whilst 80% have brochures showcasing their airport and cargo potential.

As well as working with forwarders, an important method, particularly for the smaller airports may be to work with shippers, either established ones, or potential ones. Whilst the forwarders may have the greatest amount of control, working with shippers
may also be beneficial in raising the airport’s profile. Overall 68% said they maintain contact with established shippers, whilst 60% said they work with the local business community in general. This finding is significant as one of the things cargo airlines wanted airports to do more was engage with shippers, yet it seems many airports are already doing this.

As a measure of success, 62% of those that had worked with the local business community had gained new services in the previous 12 months. Only 46% of those that hadn’t worked with local businesses had gained new services.

Beyond the realms of pure marketing, benchmarking successful (and unsuccessful) airports is an increasingly important method to allow all companies to measure and improve their performance. Just over half of the airports surveyed said they benchmarked other airports in terms of what they were offering to airlines and the methods they used to market themselves.

5.3.7 Airport cargo services: gains and losses

The most evident measure of success for an airport in terms of air service development is whether new operators have been attracted to the airport or new services have been introduced by existing operators. Of the respondent airports, 23 (58%) had gained new freighter services in the previous 12 months. When asked what they attribute this success to, the most common response was that their airport served the market that the airline was wishing to penetrate, whilst others believed that the connectivity their airports offered, or their cost efficiency, was the key factor.

Of all the new freighter services gained in the previous 12 months, 40% of these were at the airports classified as major hubs for both passenger operations and freighter services. Figure 5.7 divides the respondent airports into four categories and shows the percentage of respondents in each category that had gained new freighter services.
82% of the major gateway airports surveyed had gained new services which, coupled with the previous statistic shows that the majority of freighter operators are still favouring the larger airports with both a significant wide bodied passenger presence and a wealth of existing freighter services. In contrast, the airports that predominantly handle passengers were not as successful, with only 35% having gained new services, despite their enthusiasm for cargo as demonstrated by their TIACA membership. A significant proportion of the secondary airports with a much stronger emphasis on cargo were also successful in developing their freighter business, whilst half of the new breed on industrial airports had gained new services as shown in figure 5.7.

Whilst many airports reported gains however, 23% of the airports reported having lost freighter services in the previous 12 months. A third of these airports believed they had lost cargo services due to high airport costs, whilst 22% felt noise restrictions were a deciding factor. Restrictive air service agreements, airline financial difficulties
and the economic downturn were also recorded as reasons for the airports losing freighter services.

Secondary cargo airports lost the greatest percentage of services in the previous 12 months, 43% reporting this to be the case. This suggests that away from the main hubs where the freighter operators know the demand will be present and know that there will be a strong forwarder base, the non-integrated operators are being more experimental with their location decisions, taking advantage of their reasonably footloose nature in order to find an airport that suits them best.

5.3.8. **Airport strengths and weaknesses for cargo operations**

Airports were asked what they felt were their three greatest strengths for attracting dedicated cargo flights and also what they saw their main obstacles to be. Table 5.9 shows the top three responses from airports when asked about their strengths and shows the percentage of respondents which included the factor in the specific positions and also the total percentage of airports that included the factor in any position.

<table>
<thead>
<tr>
<th>Position</th>
<th>Response</th>
<th>% in Position</th>
<th>% Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Strategic Location</td>
<td>30%</td>
<td>51%</td>
</tr>
<tr>
<td>2</td>
<td>Strong Demand</td>
<td>23%</td>
<td>34%</td>
</tr>
<tr>
<td>3</td>
<td>Infrastructure</td>
<td>21%</td>
<td>28%</td>
</tr>
</tbody>
</table>

**Table 5.9: Most important strengths of the airports**

As table 5.9 shows, the most frequent response in terms of strengths was that their airport was strategically located, with 30% including this as their greatest strength and 50% including this in any of the top 3 positions. Following that airports felt that serving areas with a strong demand for air cargo was their second greatest strength followed by the infrastructure they can offer to freighter operators.
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The major cargo hubs were particularly focused on their strategic location being their most important strength – 46% of these airports believing this to be the case. 43% of secondary cargo airports on the other hand felt 24 hour operations were their main advantage.

The top 3 in table 5.9 match closely the responses that freighter operators gave in the airline survey (see section 5.2.8) when they were asked for their most important factors when choosing an airport. They placed demand for cargo in first position, followed by charges and then infrastructure. Whilst charges were not in the top 3 for airports, 21% did find this to be one of their 3 strengths. Of course whilst freighter operators may find this important, not all airports are in a position to offer charges low enough to be considered a strength.

In terms of what the airports felt were their major obstacles to attracting non-integrated freighter traffic, poor local air freight demand was the most frequent response, mentioned by 24% of airports. This contrasts with the 34% of airports who saw this as one of their most important strengths. This clearly demonstrates the split between the different types of airport. 50% of the airports who mentioned poor local demand were secondary cargo airports, whereas it was the main hubs and predominantly passenger airports that felt that a strong demand was one of their main strengths. Of those that mentioned strong demand as a strength, 38% were main hubs and 46% were predominantly passenger airports, likely because these airports tend to be located closer to main population centres and industrial generators of air freight demand.

A further obstacle, particularly for the secondary cargo airports was being located close to a major hub or competing airport that was successful in terms of cargo. These airports reported that a resistance to change by airlines and forwarders entrenched at these competing airports was seriously hampering their cargo ambition, whilst others reiterated previous themes from the survey, particularly in terms of restrictive national or regional air policies.
5.4 Chapter Summary

This chapter has provided empirical quantification of the factors which were seen as important influences on a freight airlines choice of airport in the literature reviewed in chapter 2 as well as the theory examined in chapter 3.

What this chapter has revealed is that providing the demand is there within a radius of the airport acceptable to the airline (which will typically increase in proportion to the length of the route), then it is the costs that are the most important factor for cargo airlines choosing an airport, more important than a faster throughput of cargo. It was found that only in special circumstances were costs superseded in terms of priority, this typically being when a carrier requires night time access to an airport. The surveys also confirm the argument made in chapter 2 that freight forwarders are a major influence on a freighter operator's choice of airport.

Whilst there is a lack of literature relating to the effectiveness of airport marketing, the surveys revealed marketing to have a limited influence on freighter operators. However they demonstrated that marketing can be effective if properly targeted and the airports have shown that in some areas e.g. freight forwarders, they are focusing their resources on factors that airlines find important. There were however factors that airlines deem very important that airports appeared less aware of e.g. the importance of their reputation. What the surveys suggest overall though is that all things being equal the airports with significant cargo services today will continue to be successful in attracting new operators.

Having identified which factors are most important and relevant to this research, and those factors which are not, these findings need to be progressed and an understanding of why and under what circumstances they are important needs to be developed in order to truly understand why freighter operators make certain location decisions. This is achieved by the series of airline and airport interviews presented in chapter 6.
6. Research Interviews

6.1 Introduction

This chapter presents findings from in-depth interviews conducted with three freighter operators and three airports of varying scale, and aims to provide verification and explanation to the factors previously identified in the literature and survey chapters.

The data for this chapter was obtained via face to face interviews with representatives from cargo airlines and airports. The individuals interviewed were, in the case of the airlines, those responsible for route development and making the decisions on which airports to serve, and in the case of the airports, those responsible for developing freighter services. The profiles of the respondents participating in the interview stage of the research are found in chapter 4, section 4.6.2.1 along with a description of the mechanisms of the conduct of the interviews and analysis.

This chapter comprises two sections – one focusing on the airline responses and the other concentrating on the responses of the airports interviewed. The interviews are analysed according to eight categories generated from the literature and theory chapters similar to those utilized during the analysis of the survey data. Both responses from airline and airport interviews have been analysed according to eight similar categories to allow comparisons between viewpoints to be made in line with the propositions in chapter 8. These categories for airline and airport interviews are summarised in tables 6.1 and 6.2 at the start of sections 6.2 and 6.3 respectively. Following the analysis of each group of interviews the significant findings are summarised before conclusions are drawn at the end of the chapter based on both airline and airport interview findings.
6.2 Airline Interviews

Face to face interviews were conducted with three freighter operators who were questioned generally on their criteria for choosing particular airports for their scheduled cargo services, as well as specifically on issues raised from the literature review and surveys such as the influence of airport marketing, the importance of airport charges, and the influence of competitors (see appendix G for questions asked). The responses are analysed below according to the eight themes summarised in table 6.1 which have emerged from the thesis to this point and from the interview responses.

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Table 6.1: Categories and sub-categories used in the analysis of the airline interviews.

6.2.1 Geography

It has been established that the first decision for a freighter operator when choosing an airport is to identify a geographical region to serve within which the airport will be selected. The first part of the airline interviews focused on what determines the decision to concentrate on a specific region with particular attention paid to industrial
clusters as discussed in chapter 3. Questions were then asked about the geographical factors that freighter operators consider when choosing an airport within the chosen region.

6.2.1.1 Air Freight Demand

One of the key theoretical themes identified in chapter 3 is that clusters of industry in a given region act as magnets for freighter operators, drawing them to serve the supply chains and to deliver the finished goods. From the interview data, demand was indeed the driving force behind the geography of freighter operators, although in some cases other factors such as customer requirements can dictate location.

"There are a number of reasons why we would choose a particular area to operate to. One of them would be if a customer approached us with a requirement and agreed to take X percent of the capacity. Provided we thought we could fill the rest of the plane then we would go close to where the customer wanted to deliver his goods. This happens but in most cases we will find niche markets where we can see there would be demand, and we liaise with forwarders on that, and look to service this demand".

(MK Airlines Interviewee 1).

The type of industry that would typically attract freighter operators is technology production (see table 2.1) as technology products are typically high value, high demand products for which air transportation offers the most benefits. Observations of freighter operators located around technology clusters such as Silicon Valley would seem to confirm this.

"Like a passenger carrier would operate in an area with a high population, we typically operate into areas where there are a lot of industries that would use our services. Being based in Hong Kong our commodities are typically technology based, although textiles is a strong market for us too, so the airports we operate to are in areas where there is significant technology production, or large consumer markets for technology produced in Asia".

(Dragonair Interviewee 1).
None of the airlines interviewed mentioned the word "cluster" unprompted. However when asked directly about the impact of industrial clusters of firms on their choice of region into which to operate, all respondents agreed that clusters were prime targets for freighter operators, providing the market wasn’t already saturated, as typified by this response.

"I would consider a cluster to be an exaggerated pocket of demand so a cluster of, say, microchip companies would be something to look at as it would probably represent a lot of demand for air freight. But it doesn’t always mean that this demand isn’t already taken up by other carriers so it could still mean there is no demand for more freighter flights".

(Kalitka Air Interviewee 1).

It is an important point that clusters don’t always equal demand, if they are already adequately served. However what these responses do show is that first of all demand is the primary factor influencing the geography of freighter operators, and also that as a necessary support service to many types of clusters, freighter operators are drawn to them as key sources of demand.

6.2.1.2 Geographical Influences

In many markets there is more than one airport for a freighter operator to consider and there will be a number of factors that will determine which airport is chosen. Freighter operators were asked what geographical criteria they look for in an airport within a given region. The main criteria identified by all interviewees was that the airport should be as close to the main areas of demand as possible.

"It helps to be in an industrialised area where you can minimise the time it takes for the freight to reach the end customer which is what forwarders prefer so they can minimise trucking".

(Kalitka Air Interviewee 1).
Another primary factor that freighter operators consider is access to the airport, as regardless of how close an airport is to a market haulage vehicles must be able to move between the two points with ease.

"Probably the most important factor with regards to exactly where an airport is is the access arrangements. With air freight you pay for speed so you don't want it stuck in traffic".

(MK Airlines Interviewee 1).

The consensus therefore is that airports that are closest to the market they serve and are easily accessible are distinctly preferred from a geographical perspective.

6.2.2 Decision Making Analysis Methods

The question of how decisions are made and who makes them was asked of interview respondents with a particular emphasis on any quantitative methods used to determine suitable airports, particularly in terms finances. As an issue that has received little attention in research to date, the interviews sought to understand to what extent the decisions were quantitative-based, or whether they were more of a qualitative and behavioural nature.

All the freighter operators interviewed responded in a similar fashion to the question of what methods are adopted in evaluating airports, and the extent of the use of quantitative assessments. The consensus was that quantitative methods were used greatly in cost calculations, although with differing degrees of complexity, with some using specialist computer software. Cost calculations were found to be particularly important for airlines making comparisons between two or more airports.

"We have a computer program which will calculate the total costs of a routing, taking into account airport and handling fees based on what we have been quoted, flying costs based on fuel price at origin, any en-route navigation costs, the actual costs of operating and crewing the aircraft, which will be more expensive as the length of the route increases, and basically any cost which we are likely to encounter flying
between two points, including the typical amount of time we can expect to spend taxiing or holding at any given airport”.

(MK Airlines Interviewee 1).

This example also demonstrates the array of cost considerations that can go into the calculation. These cost calculations are only run when the freighter operator has first identified an airport or commonly two or three airports that they were happy to operate to if the costs add up.

“To run the cost projections accurately we need to obtain a lot of information from the airports so this is something that is done only once we have evaluated potential airports and in most cases had some preliminary contact with them to see if they have something we want. Using the cost projection program is also useful for calculating the effect of any charges reduction the airport may offer”.

(MK Airlines Interviewee 2).

However such quantitative approaches are restricted to cost calculation and respondents described that less scientific methods were adopted to initially identify the airports they felt they wanted to serve.

“Costs and more importantly potential profit are something you need to calculate and get on top of, but in terms of working out what airports we want to use and would be best for us, we decide that from speaking to people, observing the market and the situation at the individual airport”.

(Kalitta Air Interviewee 1).

Freighter operator location decisions are therefore generally of a behavioural nature, confirming the belief that there is no concrete formula for how an airport is chosen. However the use of an ordered system for calculating costs does typically exist within airlines and this provides a powerful tool for which to compare different locations in situations where there are a number of contenders in a given market.
6.2.3 External Influences on Location

Freighter operators were asked about the influence of a range of industry stakeholders on their location decisions, ranging from other freighter operators, passenger carriers, customers and handling agents. Whilst the findings to this stage already indicate that these may have some influence, the focus here was to identify the extent of that influence.

6.2.3.1 Passenger Carriers

Asking both pure freighter operators and combination carriers how influential passenger carriers are on their location decisions enforces the distinction found in the survey that pure freighter operators do not see passenger carriers as particularly influential, whereas combination carriers see the location of their own passenger operations as very influential when locating in the same market.

For example, not only do MK Airlines view passenger carriers as being of no influence, they actively avoid airports with a concentration of passenger airlines.

"As a freighter operator we are looking not to be at any major airport where there are passenger activities. There is no advantage from being in a congested airport". (MK Airlines Interviewee 1).

The priority for the airline is to move cargo quickly through the airport and minimise the time the aircraft spends on the ground and the airline therefore prefers secondary airports. Asked about the possible advantages of interlining, the airline described this as "not a feature for us and wouldn't draw us to an airport". Even if it was a feature, the airline calculates that at major airports such as Heathrow cargo is trucked between terminals anyway and so trucking the cargo to another (secondary) airport would not significantly add to the shipment time.

The view that passenger operations are not an influence of freighter operators location decisions was seconded by Kalitta Air.
"Passenger airlines do not influence where we locate either positively or negatively although we don’t want to get into a situation where congestion at an airport is causing us operational difficulties. We do operate into some major passenger airports such as JFK and Schiphol (Amsterdam) but this was because of their cargo status and any delays that the passenger operations may cause us is just a side effect which we have to live with".

(Kalitta Air Interviewee 1).

As a combination carrier, Dragonair had a different opinion in terms of the influence of their own passenger service locations, although seemed to agree with MK Airlines and Kalitta that passenger operations in general were not of particular significance.

"When talking about our own passenger services, in the few markets where there is overlap with our freighter operations, we want them to be at the same location, as we carry a lot of cargo on our A330 passenger aircraft and from a cost and even a simplicity standpoint for the customers it makes sense not to duplicate overheads and it gives us maximum flexibility for sending freight by either passenger or cargo aircraft. However outside of our own passenger operations I would say they are not particularly a consideration".

(Dragonair Interviewee 1).

All this strongly suggests that freighter operators do not base their locations on those of passenger airlines, except in cases where an airline has their own passenger and cargo operations, in which case the consensus from this and the survey data is that it is desirable to collocate the two services if involved in the same market.

6.2.3.2 Other Freighter Operators

As Kalitta Air indicated in their response to questioning about the influence of passenger airlines, other freighter operators can be influential in the location decision for a number of reasons. There are potential agglomeration economies to be gained from locating with other freighter operators at a single airport location as well as issues concerning market share as indicated in chapter 3. The ability to interline with
the other carriers with complementary routes is a further example of the benefits of clustering around other freighter operators in a single location.

Integrator hubs seemed to be particular attractions for the freighter operators surveyed, precisely for the reasons of being able to tap into their networks.

"East Midlands would be attractive because there are other airlines that we could interline with and Luxembourg works well for us in that regard because we interline with Cargolux and various other airlines but at certain airfields dominated by some airlines that don’t work with others you wouldn’t want to be there. So it depends which other airlines are there and whether there is a possibility that you can commercially cooperate”.

(MK Airlines Interviewee 1).

For Kalitta their choice of Nottingham East Midlands as the airport from which they would serve the UK market was directly influenced by the integrator DHL with whom the airline has an alliance.

"Our close commercial tie-up with DHL, who have their main UK hub located at East Midlands was a big factor in our selection of East Midlands in preference to other UK airports”.

(Kalitta Air Interviewee 1).

This raises another issue regarding alliances between cargo airlines. Kalitta disclosed that their relationship with DHL “brought the advantages of East Midlands Airport to our attention”. In such situations where a partner has operated at an airport successfully for a number of years, the attractiveness of that airport becomes markedly increased not only from the advantages of interlining but also because of the perceived reduction in risk which is typically associated with operating to a new airport as other airlines have shown that it is a reliable airport to use.

There was a consensus on the influence of competing freighter operators with the airlines claiming that they do consider competitors in situations where their networks overlap.
"It is always important to understand what your competitors are up to and to know where they are being successful. Of our four flights into Europe we are located at the same airport as our direct competitor on three of those and the other route, to London, we serve Stansted principally because we can't get into Heathrow where Cathay (Pacific) are. Now ask me whether this is deliberate and the answer is yes and no. With the possible exception of Stansted all the airports we fly to in Europe are central to a strong market for freight moving to and particularly from Hong Kong. This is the reason we are where we are. However having Cathay at Frankfurt for example makes it much less likely that we would choose an airport such as Hahn as it is clear where the forwarders would send the cargo".

(Dragonair Interviewee 1).

Other freighter operators therefore do have an influence in a number of ways such as the need to protect market share which has made it particularly difficult for secondary airports to thrive without intervention from regulation. In particular though the possibility of being able to offer an extended schedule through interline agreements with other carriers at these airports is the main incentive.

6.2.3.3 Freight Forwarders and Shippers

The influence of freight forwarders on the scheduled, non-integrated freighter operators has already been well documented in chapters 2 and 5 and the interviewees only served to strengthen the belief that forwarders are the greatest external influence on location decisions. As MK Airlines describe, "With heavy freight, the freight forwarder dictates".

Dragonair describe the problems that locating away from a major forwarder base can cause, as was the case when they located their first UK freighter service at Manchester when the UK freight forwarding industry is disproportionately located around Heathrow.
"The major freight forwarders have their main UK offices located in the Heathrow area and will truck freight from the outstations to Heathrow to consolidate and then may truck it back to Manchester to use our service. Some forwarders allow their outstation offices to select their own carrier and move locally but a lot depends on the freight rates that they have. So generally being in a preferred forwarder location is very advantageous".

(Dragonair Interviewee 1).

Freight forwarders will typically use the lowest cost carrier in preference to the most convenient routing and rates are typically lowest where there is most competition and where the forwarder has developed special rates with airlines in exchange for providing them with a certain amount of business. Hence locating close to forwarder bases is important in order to secure this business.

Whilst forwarders may be regarded as the most important external influence, shippers are nonetheless influential too.

"When you get into freighters you do have to listen to the client, although its not necessarily the freight forwarder but often the ultimate client, it may be IBM, BMW, VW or whatever".

(MK Airlines Interviewee 1).

However the consensus from all the carriers interviewed was that the influence of the shipper is more concerned with bringing a freighter operator to a particular region and not necessarily to a particular airport within that region.

"I wouldn't say that the shippers have that much influence, certainly not as much as the forwarders. Sure we think about shippers when we are evaluating demand on a potential routing because ultimately it is them that provide the freight but they would never say, oh you must fly from JFK and not Newark unless they were chartering the aircraft".

(Kalitta Air Interviewee 1).
Ultimately shippers use freight forwarders to transport their goods and the shipper will generally have no preference over which routing their cargo takes, hence the direct influence of shippers on freighter operator location decisions is somewhat limited.

6.2.3.4 Handling Agents

The influence of handling agents has featured little in the findings identified to date, yet all freighter operators interviewed indicated that the handling arrangements at an airport were factored into their decisions.

"We do factor in handling companies into our decision making. In the case of Manchester, Menzies had the best facility and equipment within the facility to handle cargo and this was a factor".
(Dragonair Interviewee 1).

"We always check performance criteria for handling companies to ensure that they can comply with the required service levels demanded by the freight forwarders".
(MK Airlines Interviewee 2).

There are a number of facets to the influence that handling companies may have on freighter operators. As well as the necessity that handling agents have the required equipment and expertise and can perform to a level which will not compromise the service offered to customers, the tariffs levied are also an issue for consideration.

"We always keep an eye on handling charges as they can vary greatly between airports and is usually dependent on what competition there is. If you have a monopoly situation then you can get screwed if you are not careful ... Cheapest is not always the best but value is important".
(MK Airlines Interviewee 1).

For this reason, if MK Airlines are looking to establish a significant presence at an airport then they look for an opportunity to self handle.
"At Ostend we also have the right of self-handling which we would never get at a big airport so if we are self-handling and we can't turn the aircraft in 3 hours we should fire ourselves. That's why for a freighter operator like us an airport like Ostend is perfect".

(MK Airlines Interviewee 1).

The response from the airlines very much suggests that for handling agents a certain service quality and price is expected and would only have an influence on location if these were not met. In other words the negative impact of poor service or high charges is likely to be more prominent in determining location than the positive impact of low charges or excellent service.

6.2.4 Airport Attributes

This section focuses on the opinions of freighter operators with regards to airport characteristics and policies towards cargo with the aim of determining how influential issues such as congestion and slot allocation, infrastructure, the priority afforded to cargo by airports and the speed of cargo processing are.

6.2.4.1 Congestion

The impact of congestion at an airport on whether the freighter operator would choose to operate there varied between respondents. Both sides of the argument were presented with views that this was a principal disincentive, to an attitude that this was something that could be tolerated in order to avail of the other benefits of the congested airport.

"Nobody wants to be at a congested airport but sometimes that is the price you have to pay for being where you want to be. As long as the congestion is not out of control we can work around this. Even though Heathrow is terribly congested airlines still want to operate there because they know that is where they can get the best yields and the most freight forwarder support and feed from other carriers".

(Dragonair Interviewee 1).
MK Airlines however had an alternative view. Their aim is to have the aircraft spend as little time on the ground as possible and therefore see congested airports as a barrier to this.

“There is no advantage for us from being in a congested airport. We want the cargo off the plane and on the back of a truck as quickly as possible and we don’t want to start getting caught up with passenger carriers ... Aircraft have to be in the air 14 or 15 hours a day minimum, 365 days a year and an airport shouldn’t be your stumbling block”.

(MK Airlines Interviewee 1).

The extent to which aeronautical congestion impacts on location decisions will vary according to the priorities of the carrier. The assumption with the first example is that congested airports are typically major gateways which facilitate feed to other carriers and have a strong freight forwarder presence. In this instance it depends on how much importance each carrier places on these factors versus the need to minimise the time spent on the ground. Airlines with little reliance on feed from other carriers will therefore be greatly influenced by congestion whereas carriers more dependent on interline connections will be more inclined to tolerate delays in favour of the benefits such airports offer.

The other facet to congestion besides aeronautical is the time it takes the actual freight to pass through the airport to its final destination and there was agreement that long delays in cargo processing were a significant disincentive as customers demand speed from air freight.

“It is an interesting statistic that 2% of the worlds trade is carried by airfreight but it is 46% of value, that’s how important it is and all you are paying for is time. Warehouses at airports are only there to pass the freight through, they are not there to store freight”.

(MK Airlines Interviewee 2).

There are a number of hurdles at the airport that the cargo has to negotiate such as security, customs inspection and warehouse clearance. However the responses
revealed that the first two tend not to vary from airport to airport as much as the warehouse times which can cause significant delays.

"Customs can cause delays in some locations but this is usually country-dependent and there is rarely too much variation within a region from airport to airport providing they are open 24 hours. Generally where you get stung at the big airports is the warehouse time".
(MK Airlines Interviewee 2).

MK Airlines illustrated the difference in cargo throughput times at different London-area airports and the reason why they actively avoid major airports such as Heathrow.

"One of our measuring sticks in terms of the efficiency of an airport which is the time from when you land to the time when cargo is on the back of a truck and you look at where this is going to be most efficient. At Manston our record was 45 minutes to the road and at Stansted you would average 4-7 hours and Heathrow is known to be up to 24 hours. Why bother flying a product at 8 miles a minute when it sits in a warehouse for 7 hours?"
(MK Airlines Interviewee 1).

Whilst the amount of time an airline is willing to allow for freight to pass through the airport varies from carrier to carrier, there is always a limit because ultimately customers use a particular service because of its speed. If consignments cannot meet delivery targets because they are held up at an airport then forwarders will soon find an alternative service. Delays in cargo processing can therefore be a principal disincentive for airlines to operate to a particular airport.

6.2.4.2 Priority Afforded to Cargo by Airports

A prominent finding from the airline survey was the high level of importance that freighter operators placed on the priority that airports give to cargo flights and their overall attitude towards cargo in general. The airlines interviewed confirmed that this was indeed important to them.
“East Midlands is a Freighter friendly airport and the airport management give priority to all-cargo operators, unlike some other UK airports where in our perception cargo operators are given significantly lower priority than passenger carriers. The fact that EMA welcomes freighter operators was definitely a factor in choosing the airport”.

(Kalitta Air Interviewee 1).

Freighter operators were also asked to explain exactly why they placed such an importance on the priority given to cargo by airports. The responses suggested that there were two primary reasons for this. First of all freighter operators wanted to be able to make long term decisions based on operating at a particular airport and therefore needed to know that the airport was committed to keeping cargo airlines and not forcing them out in favour of passenger carriers.

“What is frustrating is that most businesses run very short business plans over 12 months or 3 years, and the market forces people to think that way. The problem you have when you have an asset like an aeroplane, you’re stuck with a 15 to 20 year business plan and then you tie your plans into that long term then you get messed around on short term politics. So there is a lot of thinking we have to do and then we have to start second guessing people. We need to know that an airport wants a cargo operator and isn’t going to cast us aside when the passenger business grows”.

(MK Airlines Interviewee 1).

The other reason given was that freighter operators from experience felt that at non “freighter-friendly” airports the passenger operations would typically take priority with regards to day to day operations as well as the availability of slots when expansion was sought.

“What happens at the major airports is that you end up with an operators committee dominated by passenger airlines then all the decisions at that airport become orientated towards passenger services and freight becomes the discriminated party so you move away from it. We need to know that the airport wants to see us succeed and allow us to expand in the same way it would with any operator”.

(MK Airlines Interviewee 1).
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For freighter operators regularly changing airports, whilst possible, is certainly not desired. They need to establish a market presence and gain confidence from their customers and hence they need to have that same confidence in the airports that they operate to in order for long term plans to be made and to ensure efficient operations.

6.2.5 Costs

As well as airport user charges, this section focuses on explaining how all the various costs of operating a cargo service fit together and exactly what savings can be made from one airport to another in order to identify the extent to which costs influence location decisions.

6.2.5.1 Airport User Charges

All of the freighter operators interviewed found airport user charges important and provided examples of when this had had at least some bearing on their decision to locate at a particular airport.

"That's one of the reasons we moved to Manston at that time because Manston gave us a very competitive price".

(MK Airlines Interviewee 1).

"Airport user charges are significant to us ... The discount offered on landing fees during the first year of operation was certainly a powerful incentive".

(Kalitta Air Interviewee 1).

Whilst these examples clearly show that airport user charges can have an influence on the locations of freighter operators, they add little to the findings from the airline survey. The freighter operators interviewed were therefore asked how airport user charges compared in influence to other charges associated with the operation, and where their overall level of significance lay.
"If you take the landing fee, and sometimes they charge a navigation fee for ILS, that becomes 2% of the whole thing - nothing. The handling at the airport is more significant".
(MK Airlines Interviewee 1).

"We would not allow ourselves to be influenced by cheap landing fees if the airport was not right for us in other regards too. For example there would be no benefit from paying nothing for landing and then have our cargo sat around for days on end for customs clearance".
(Dragonair Interviewee 1).

The consensus is that airport user charges are not the most significant of costs and alone would not be a great influence on location decisions unless the airport had satisfied other factors such as demand and speed. Regardless airports are very keen to offer discounts to lure freighter operators and it was revealed that handling discounts were not as common as for airport user charges. The influence of handling rates was therefore viewed as a negative impact whereby airports had been discounted due to fees being too high.

"The handling at the airport is more significant (than landing charges) and that can become 10-12% of the operation. So if you have monopolies or duopolies on the handling as many airports have, you can get hammered on the charges and that can cause problems".
(MK Airlines Interviewee 2).

Freighter operators revealed that airport user charges are more flexible and open to discount than handling charges, hence emphasis is placed upon the former as a means to cut the cost of an operation, even if the savings are relatively small.

6.2.5.2 Flying Costs

Despite the significant costs associated with turning around an aircraft on the ground, it is the cost of operating the aircraft in the air that is proportionately the most expensive part of an air cargo operation.
"Geographically flying an aeroplane you can cost a 747 at $13,000 an hour to fly and $4,500-$5,000 per hour for a DC8, so you can imagine the cost impact of even a small amount of extra flying. It certainly puts into perspective any savings we might get from airports".

(MK Airlines Interviewee 1).

MK Airlines explained that this has had an influence on which airport it uses on a number of occasions where there are multiple geographically dispersed airports serving a single market, for example on their routes from Africa to the UK.

"We try not to go too far north. For example we can get a fantastic deal at Prestwick but if you are flying from Africa the deal is killed by that flying time. East Midlands was a good deal and it's a lovely distribution point for England, but you have that same problem of coming in and out ..."

(MK Airlines Interviewee 1).

In a multiple airport system it is therefore preferable financially to operate to a destination airport geographically closer to the origin or an origin airport closer to the destination, even if this means an increase in trucking on the ground.

"Trucking costs much less than flying, except in the USA where is can be expensive because it is controlled by the unions".

(Kalitta Air Interviewee 1).

The main reason why flying is much more expensive is due to the lease rates on aircraft (if applicable), the crewing costs and in particular the fuel costs.

"Well 45% of the operation is fuel. Obviously depending on where the airport is and whether it had pumped in fuel or it is very far from a refinery, the fuel price can differ quite a lot. So the airport can either, by its location, save you on fuel or not".

(MK Airlines Interviewee 1).
Hence the cost of purchasing fuel at airports is an increasingly important factor in the location decisions of freighter operators and the responses suggest that fuel price varies more than the other ground costs from location to location.

"Fuel price can vary greatly from airport to airport, country to country" (Kalitta Air Interviewee 1).

In real terms few if any airports can be closest to the flight origin, offer the lowest fuel price, have the lowest cost landing and handling charges and be central to the market being served. Hence a trade-off has to occur based on the overall financial impact of these combined costs. What is clear however is that overall costs can vary greatly from location to location and are therefore an important airport choice factor.

6.2.6 Regulatory and Political Issues

Regulatory restrictions represent the most constraining element for freighter operators planning new routings as identified from the airline survey, with more localised political involvement a further constraint in certain regions. With regards to regulatory and political issues, freighter operators were questioned on the extent to which these issues are constraining them and the effect these have on their location decisions.

6.2.6.1 Environmental Restrictions

The most significant environmental constraints for freighter operators are restrictions on night operations and noise restrictions. Night curfews in particular are increasingly problematic for freighter operators with the result that they actively avoid airports that constrain them in this way.

"Another thing we look for, and the primary reason for moving to Ostend from Manston is 24 hour operations - got to have it. You can't have an asset restricted by
curfew time. A 747 sitting on the ground looses you huge amounts of money in a day, purely due to noise restrictions".
(MK Airlines Interviewee 1).

However the interviews confirmed that this is only an important factor for freighter operators where night operations are required, in which case it is an overriding factor not to operate there. In situations where the flights occur during the day though, night curfews do not impact on the location of freighter operators.

"24 hour operations are crucial to us in our Asian markets, although not so much at our European stations due to the timings of the flights during the day. For example Manchester has night restrictions but this didn't really affect our plans to operate there (due to the timings)".
(Dragonair Interviewee 1).

Restrictions on noisier aircraft have become less of a locational influence since blanket bans on stage 2 aircraft have been imposed in the European Union and many other parts of the world. However due to issues with local residents many airports still restrict the noisier of the current aircraft through noise quotas which limit the amount of aircraft noise permitted over a period of time.

"We've only had noise issues at major airports, like Amsterdam. They have noise quotas so they don't want a noisy aeroplane because of the quota and therefore they charge more for noisier aircraft and at the end of the day that's sensible but it does act as a deterrent to us operating there".
(MK Airlines Interviewee 2).

Environmental restrictions have become such a common barrier for freighter operators at major airports that they have been responsible for the growth of freighter operations at secondary airports in more remote locations.
"When you get hit in this way you can either move to another airport away from the population or you can invest millions of dollars on new equipment which we don't want to do right now".
(MK Airlines Interviewee 1).

Hence night and noise restrictions have shown themselves to be very influential in determining where freighter operators do, and more precisely do not operate.

6.2.6.2 Bilaterals

Freighter operators have found the lack of distinction between traffic rights for passenger and cargo flights frustrating, as this has inevitably been to the detriment of such carriers in many regions where they are only permitted to fly to specified airports. Like with environmental restrictions this has a negative impact on their choice of airport.

"What is frustrating is the bilateral agreements that exist and the passenger carriers hold on to that. With those bilaterals in place they are actually frustrating the aviation community. We get influenced therefore in identifying that we want to go into that region but we may not be able to go into a particular airport because there might be traffic right restrictions".
(MK Airlines Interviewee 1).

It was revealed that the result of this is that certain airports become much more attractive to freighter operators than they would be in a free market.

"An airport like Luxembourg which we operate into is ok because it's open skies but for that we are paying a lot of money. If we had a free choice we wouldn't use Luxembourg because of the costs involved".
(MK Airlines Interviewee 1).

The feeling that restrictive air service agreements had in some way restricted their network development ambitions was one which was common to all freighter operators
surveyed and this is clearly an influence on the geography of international freighter operators worldwide.

Freighter operators were asked what impact a completely open market would have on their operations and this was met with a mixed response. On one hand they have come to terms with the restrictions and developed a business around them and grown in to the markets they serve and therefore feel they don’t need to move away from these markets.

"We’ve found our niches in all the world markets so we wouldn’t change significantly if there was a completely open market because we’ve built up in this market environment".
(MK Airlines Interviewee 1).

On the other hand there are many potentially lucrative markets that some freighter operators are currently unable to exploit but would be very enthusiastic about doing so under a liberal regime.

"There are definitely new markets we are keen to enter as well as new airports in existing markets but are restricted from doing so at the present time and I think if air cargo was liberalised you’ll see a lot of shift in some markets”.
(Dragonair Interviewee 1).

Given this information it is not unreasonable to assume that many airports have suffered from bilateral restrictions just as many others have benefited, and that the geography of freighter operators at airports would have been different in their absence.

6.2.6.3 Political Involvement

The consensus from the interviews is that direct political involvement is rare. The most common instances of politics playing a role in the location of freighter operators is through the creation of an environment in which the airlines do not desire to
operate. Two examples of this that were cited are the effects of a militant workforce through heavy unionisation, and a strong environmental agenda by local or national governments.

MK Airlines has had experience of both and declared itself weary of investing in areas demonstrating such characteristics.

“We keep ourselves as footloose as possible simply because of the fluctuations in local politics”.
(MK Airlines Interviewee 1).

The airline described how during 2004 it returned to Ostend Airport in Belgium after leaving the airport in 1993 due to the uncertain atmosphere caused by local politicians who were constantly threatening to ban night operations and impose noise restrictions.

“Ostend was very much out of favour in the early 90's because they had a green party in place and they started with all the environmental threats and that forced people to reconsider because when you've got a fragile political party there nobody is going to invest so you just pull away. We pulled away from Ostend in 1993, pulled away for those reasons”.
(MK Airlines Interviewee 1).

However following a political change the airline considered returning to Ostend once assurances were given that their operations would not be affected by legislation.

“This time around Ostend was desperate for the business and the politicians gave a very firm message that they were not going to mess the airlines around anymore”.
(MK Airlines Interviewee 1).

This is a clear demonstration of the actions airlines are willing to take if the political situation threatens their operations. In a similar vein unionisation and the threat of strike action can also be deterrents to airlines, and airports in France have had particular problems attracting freighter operators because of this.
"The work force is very militant in the Flemish region (of Belgium) whereas the unions are dormant in the Ostend region. Likewise, if you go further west you end up in Vatry and it's the same situation there with the French militant workers. We can't afford to have our aircraft stuck on the ground because of any sort of strike action. It probably seems quite a long way away from the main thought process but it is important because if we don't have fuel or ground handling that will affect us very directly".

(MK Airlines Interviewee 2).

Of the airlines interviewed only MK airlines had been particularly affected by such political involvement, to the extent that such issues had shaped its European operations to some degree. All airlines recognised that this can be an issue in certain regions though.

6.2.7 Airport Marketing Influence

In order to identify how effective marketing is and to build upon the survey findings, freighter operators were asked specifically about the influence of advertising and incentives, what marketing approaches are most likely to interest them, and generally about their observations of airport marketing practices.

6.2.7.1 The influence of Airport Advertising and Promotion

The aim of airport advertising methods, such as print advertising or presence at trade shows, is to promote awareness of their airport in order to ultimately attract new airlines. The question is how effective is this in achieving its aim and how do freighter operators respond to such marketing with regards to airport choice? The feeling among airlines was mixed regarding the impact airports promoting themselves had. The first reaction from those interviewed was that it had a limited impact as the freighter operators are generally aware of the airports anyway.
"Everyone gets to know the airports. It's a small world but you get some airports that are good to listen to if they can offer you things others can't. Basically though you pick your airports and get onto them".
(Kalitta Air Interviewee 1).

However the freighter operators also recognised that rather than acting to inform the airlines of an airports existence, airport advertisements were of most use merely as a symbolic gesture that airports were interested in cargo, which as already shown, can be influential.

"I suppose if you are talking about advertising it doesn't do any harm to remind people every now and again that you're there but the industry is such that we generally get a feel for who's who anyway but its getting so competitive I guess they have to do something".
(Dragonair Interviewee 1).

"The marketing efforts of East Midlands are certainly freighter operator focused and the fact that EMA welcomes freighter operators was definitely a factor in choosing the airport".
(Kalitta Air Interviewee 1).

The importance of airports placing such emphasis on self promotion is heightened when it is viewed in conjunction with the finding that airports' attitude towards cargo is an important decision making factor for freighter operators. As one of the ways in which airports can show that they view cargo positively, advertising can have an indirect impact on the locations of freighter operators.

What the freighter operators interviewed saw as the best form of advertising though is simply through personal contacts, something the airlines want to see more of.

"The best form of airport promotion had to be through personal contacts and just speaking to people. That is how you get the best feel for things".
(Kalitta Air Interviewee 1).
Whatever method used by airports to gain awareness and most importantly the trust of freighter operators, it is most effective if sustained as freighter operators get to know which airports they feel they can work with over an extended period of time.

6.2.7.2 The Influence of Incentives

The freighter operators interviewed identified a number of incentives that airports had offered in the past in order to encourage them to use their facilities. Typical examples of incentives included landing fee reductions of varying durations, free aircraft parking, marketing support and reduced facility rentals. The feeling again however was that incentives are more symbolic than of direct influence.

"Airport's rarely offer incentives that are more than token gestures. Take a landing fee reduction as a typical example. If they reduce it by even 25% for 6 months, really that's 25% of not much compared with some of the other costs. Don't get me wrong that's nice to have but only if all the other numbers after 6 months crunch, as well as all the other things you have to consider".

(Dragonair Interviewee 1).

It would seem however that their influence does stretch beyond the indirect levels of advertising. One airline for example saw incentives as routinely "part of the package" when negotiating with airports, rather than something special. Nevertheless for this airline incentives are considered as part of the decision with their absence having a negative impact.

"... So we get information on handling, see if there is a negotiation opportunity from the airport in terms of incentives to attract the business..."

(MK Airlines Interviewee 1).

And for another of the airlines too, it was stressed that incentives can play a part in the location decision but only if either the incentive was sustainable or the conditions are such that the airline is still financially able to operate from the airport once the incentives end.
"It's a funny one because this is something nobody really wants to talk about, but of course if the airport can offer you something which will help make a service work then you listen. You just have to make sure you are thinking as far into the future as necessary so you are not blinded by excellent short term deals and then paying for it once it ends. Some airlines will just take the deal and then move on when it ends but really if we make a decision to fly somewhere we make it with the long term in mind ... Any kind of incentive that helps us really establish our operation would be the most desirable for us".

(Kalitta Air Interviewee 1).

It would seem therefore that the most effective type of incentives are those offering support for the airline to develop its services, for example through marketing support. This provides a long term benefit which is what the airlines are looking for. Short term financial incentives were considered by the airlines interviewed to be something of a bonus or a symbol of the freighter-friendly nature of the airport. Therefore their locational influence could, in most situations, be described as limited. However they are perhaps most effective in multiple airport regions where there is direct competition between airports which meet the geographical and financial criteria of airlines.

6.2.8 Airline-Airport Interaction

The relationship between the freighter operator and the airport and the significance of this to the formers location decision is the focus of this section. Whilst by its very nature an identification of the effects of such 'behavioural' aspects can not be generalised beyond the case in which it occurs, recognising situations in which they have been influential showcases the potential of behavioural aspects to be a factor in future location decisions. Further questions sought to identify the typical stages of the decision-making process.
6.2.8.1 Airline-Airport Relationship

The air cargo industry is more relationships driven than most and these relationships may play a role in the locations of freighter operators. The freighter operators interviewed acknowledged that close personal relationships can at least foster consideration of a particular airport, and in certain cases can have a fundamental impact on where freighter operators locate.

"Our CEO used to be the chief operations officer for another airline which operated freighter flights into Manchester, hence when it came time for us to launch operations to the UK he was very aware of the operation there which contributed".
(Dragonair Interviewee 1).

"We have known (Cargo Development Manager) and his colleagues at (airport) for many years, and had operated ad hoc charter flights through the airport prior to establishing our regular scheduled services. The airport is always well represented at industry forums and exhibitions and we have often met (Cargo Development Manager) and his team at such events. This knowledge of the airport and confidence we were dealing with professionals contributed to our decision".
(Kalitta Air Interviewee 1).

An example of relationships having a more fundamental impact on location is given below. It was stressed by the interviewee that this was the first time this had happened at the airline and should not be considered a typically occurrence.

"Our decision to fly to (airport) was very unique in that somebody that used to work in a senior position at the airport came to work for us so I suppose you could say the deal was done from the inside".
(Kalitta Air Interviewee 1).

Relationships between freighter operators and airports, as well as those between freighter operators and support services and other operators can have some bearing on freighter operator locations but the extent of this influence is impossible to measure and is seldom fundamental. Given the individual nature of such relationships, it is not
prudent to generalise that they will have an influence in all cases. The important output from this section though is that in very rare circumstances whatever policies are put into place by airports, whatever facilities they have and however well located they are, they can very occasionally be superseded by simple personal preference.

6.2.8.2 The Decision-making Process

Freighter operators were asked to describe the typical process they go through when selecting an airport for a new service in order to build, in conjunction with the case study, a fuller picture of what typically happens and when. From these responses there was confirmation that identification of the market is the first stage in any location.

"Before actually looking at the airport it's the trade flow, the market that is the fundamental. So you go looking to a region first of all such as Asia, North America or Europe. The freight in the aircraft isn't like passengers, it's a completely different model because freight flows one way. If we bring a bean up from Kenya is comes to England and gets eaten. So what I look for first of all are the one way trade flows. We then match this with a different product coming back and you end up with a triangular route".
(MK Airlines Interviewee 1).

"If we are in a position to open new routes and by that I mean if we have the aircraft and resources then we can act in markets we think we can serve successfully and make a service work. So the market is the trigger for a new service and hence our first consideration".
(Dragonair Interviewee 1).

Consideration of specific airports is very much a second stage in the majority of cases although it was identified below that there are cases when a specific airport is identified from the start as would be the case if there was only one airport serving a particular region.
“As for when we start to look at specific airports it varies in each situation. Sometimes there will be an obvious airport to use and we will have considered this airport all along and it is just a case of ensuring we can use the airport and that the terms and costs are within our range. Other times there will be a number of airports from which we can serve a market and we will start to evaluate some or all of these in detail once we have a full understanding of the market”.

(Kalitta Air Interviewee 1).

Once a specific airport is chosen, one airline described how they then ensure the airport is fully suitable to use from a safety and aeronautical perspective.

“Any new airport we operate to there is a process. Obviously we’ve identified the commercial requirement to operate to that region, and we have an airport in mind that we wish to operate to. Then operations have a checklist that they run through. First of all safety will check safety issues, such as terrain, through to fuel supplier, through to this and this in terms of safety. Then there is a performance issue – can they meet the performance requirements we are looking for in terms of the routing, i.e. runway length, or temperature variation throughout the year, things like that...”

(MK Airlines Interviewee 2).

The process described above of evaluating some of the performance characteristics that could potentially render the airport unusable after they “have an airport in mind” is at odds with the proposition that unsuitable airports would be discounted before a detailed evaluation of potential airports is carried out. However the airline conceded that they do make themselves aware of regulatory restrictions affecting airports in the region first as well as basic information on whether the airports could handle their aircraft.

“Yes, you’ve got to look at market access and politics early on, once you get through that you can start getting down to things”.

(MK Airlines Interviewee 2).

In terms of how long the process of airport evaluation takes, it would appear to vary greatly in each particular case. Typically it was identified that it can take 2-3 months
to choose between airports in situations where there are multiple airports to consider and then even longer to conduct negotiations with all the parties involved at the airport.

"Well the negotiations with Ostend took 6 months. To implement it it can be done very quickly. It depends how much you invest into the local structure itself as to whether you get tied to an airport".

(MK Airlines Interviewee 1).

However the consensus in this regard was that there is no magic answer with the length of the process taking as long as it takes.

None of the freighter operators interviewed disagreed with the general process brought forward from the literature as a research proposition. There was suggestion however that this should perhaps be modified to make a distinction between market factors and technical factors and that an evaluation of technical factors should occur once a location had been chosen based on market factors such as costs, competitors and customers.

6.2.9 Summary of Significant Findings

The focus of the in-depth interviews on interpretation has also resulted in a greater insight into some of the findings from the surveys and has revealed 6 findings significant to the aim of the research as summarised below.

- Freighter operators revealed that demand was the main driving force behind the geography of freighter operators and that clusters of industrial activity, as "exaggerated pockets of demand", did have an influence on their region of operation, although it was stressed that clusters don't always equal demand, if these clusters are already adequately served.
- Combination carriers saw the location of their own passenger services at a particular airport as influential for reasons of simplicity and cost minimisation from locating both activities together. Pure freighter operators on the other hand
did not see the presence of passenger carriers at an airport as an influence, with some even viewing this as a disincentive to choose a particular airport.

- An airport with a concentration of freighter operators was considered advantageous, although this was typically more for reasons of protecting market share and reducing the perceived risk of a new location.

- Significant freight forwarder activity at an airport is an important attraction for freighter operators with regards to providing access to demand for a service, whilst shippers in the vicinity of an airport are important to provide an indication of the demand in the first place.

- The most important factor outside of demand though was revealed to be costs. Of these costs airport user charges were considered to be of minor importance when compared with the cost differential of flying to one airport over another, and also when compared with handling charges.

- It is important for an airport to display an enthusiasm for cargo which would typically be transmitted through the marketing activities airports undertake. The actual advertising methods used by airports were found to be limited in terms of direct influence, yet its symbolic significance was recognised.

These airline interviews have shown a number of factors to be very important for cargo airlines when choosing an airport and have reinforced and developed the findings from chapter 5. The second part of this chapter concentrates on the airport’s role and their opinions on the factors influencing cargo airlines’ choice of airport.
6.3 Airport Interviews

Face to face interviews were conducted with three airports profiled in section 4.6.2, who were questioned on the factors they thought influenced non-integrated freighter operators to choose their airport and also on their marketing practices aimed at attracting such carriers (see appendix H for questions asked). These interviews allowed for a coherent comparison between what the freighter operators look for in an airport and what the airports are providing, both in terms of services and marketing. Issues such as competition between airports, the constraints they face in terms of legislation and the airport's side of the airline-airport relationship were also discussed in order to increase understanding of the role of the airport with regards to the subject of the thesis. Consistent with the airline interviews, the responses are analysed below according to eight themes which have emerged from the thesis and from the responses given in the interviews. These are summarised in table 6.2.

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Table 6.2: Categories and sub-categories used in the analysis of the airport interviews.
6.3.1 Geography

Given that freighter operators first consider the geography of an airport before any other factor, airports were questioned on what they saw to be the main geographical influences on freighter operators and how they saw the relationship between demand and freighter operator locations. The effect of the above on their success as a cargo airport was also discussed.

6.3.1.1 Geographical Influences

Airports were asked about their geography and what they felt to be the most important geographical aspects that impacted on the location decisions of freighter operators. They acknowledged the importance of a location close to pockets of demand as the primary geographical factor for freighter operators with even airports not located particularly close to such demand promoting this as an advantage of their location, for example Manchester Airport mentioned its ease of access to the London area.

"You have people like MASKargo, Dragonair, and recently China Airlines who've come here because they can't get into London and they see Manchester as being the next viable option. They can still serve the London market because we can get trucks down there easily. You've got the North of England market and easy access to Scotland ... for the non-integrated freighter operators, the closeness to London is the key factor".

(Manchester Airport Interviewee 1).

This potentially has an impact on airport marketing. Given the acknowledged importance of being located so as to serve areas of demand, one of the most important elements of airport marketing is to convey this fact to freighter operators and this is something that airports have, in the main, got right.

"We show potential airlines how we compare with our competitors in terms of demand. We think that is very important".

(Manchester Airport Interviewee 2).
The name of the airport is the main factor in terms of linking an airport with a market and many airports have in the past changed their names in order to better indicate this link, although not necessarily for cargo purposes. By pure coincidence, of the airports interviewed, two had undergone recent name changes themselves to reflect their geographical allegiance to a particular pocket of demand. MidAmerica Airport was renamed, MidAmerica St. Louis Airport as it acknowledged that name recognition was a particular problem for them, and East Midlands Airport was similarly renamed Nottingham East Midlands Airport. During the interview with Nottingham East Midlands Airport, the impact of this name change on cargo was discussed.

"Previously people have come to the stand at exhibitions and asked "where's that?" and we'd have a huge map of the UK with East Midlands in the middle. I think it improves things because it gives people a city to associate with now which for cargo has an importance and hopefully it should help to raise awareness".
(Nottingham EMA Interviewee 1).

With regards to other geographical influences, airports felt access was particularly important for them to get right in order to attract freighter operators, which matches with what the freighter operators themselves felt important from a location.

"You need easy airfield access to be a successful freighter airport and truck access to the cargo terminal. On a wider scale you also need to be connected to the national transportation network, particularly the major highways".
(Nottingham EMA Interviewee 2).

One of the questions asked of airports during the interviews was what they saw as the ingredients of a successful freighter airport. One typical response of "Location, location, location - your market has got to be close and accessible" confirmed the importance with which airports see their location in attracting freighter operators.
6.3.1.2 Air Freight Demand

For airports it was felt that demand for cargo in their catchment area was what made the ultimate difference between success and failure. It was particularly noteworthy that airports were talking about clusters and they realised the impact these have on the location of freighter operators, underlining the real impact of a key theoretical theme.

"I always bring to attention of the airlines I talk to the cluster of automobile manufacturers we have around here and the high-technology companies because it's what they want to know - that their planes will not fly empty if they come here. A large O & D market for cargo makes for a successful airport".
(MidAmerica Interviewee 1).

Two airports interviewed placed an emphasis on trucking as an indication of demand and again emphasised that without demand airports cannot succeed with cargo.

"When I first came here nobody was looking at all the trucks passing the airport but I see them as the key sign that we can succeed here as a freighter airport as it shows there is a lot of cargo passing through this area that could just as easily fly into here".
(MidAmerica Interviewee 1).

One of the most common demand-related complaints by airports which related to all those interviewed and also common for most airports worldwide, was the imbalance between import and export cargo.

"If there is anything I do have a problem with is how much cargo is imported compared with how much is going out. Sometimes that can be a problem for the carrier. We know that from the Far East there is lots of traffic, but they all want to bring something back with them and that's where it gets a bit difficult".
(Manchester Airport Interviewee 1).

As the above examples show, airports understand the importance of demand for freighter operators when choosing airports, and realise that this is linked to their own
success. What the airports must be able to do though is to ensure that freighter operators are aware of this demand, particularly with the increasing level of competition.

6.3.2 Airport Market Analysis

In order to evaluate the effectiveness of airports in terms of developing freighter services, it was important to understand how well they are informed about the market in which they operate. Questions were therefore asked aimed at identifying the extent to which airports utilise analytical approaches to understand their market, improve their performance and increase their marketing power to airlines. The question of whether airports seek to learn from other airports through benchmarking was also explored.

6.3.2.1 Analysis Methods

The airports interviewed indicated that it was important to understand the exact characteristics of the freight that flowed through their region in order to identify exactly where opportunities for further freighter services exist which was universally felt would assist with their marketing. However it was significant that each airport regardless of geography, complained that data on freight movements was not readily available and would be very expensive for the airports to compile themselves.

"There is no UK database and probably not anywhere else in terms of where the freight is coming from, where is it going to and how is it getting there. We asked some consultants and we worked out that for our flown throughput, there was another 50% going out on trucks. What we really don't know is how much is coming from this area, straight past our door and down to London. DfT thought that to find out would be too expensive, several million pounds to commission a report so it isn't going to be done without airports' own financing".

(Manchester Airport Interviewee 2).
The airports felt that information regarding where freight handled through airports actually comes from and is destined for would be valuable for determining the potential for their airport in terms of cargo growth and for showing potential airlines exactly how much freight a service to a particular location could generate.

"On the passenger side you have the CAA doing origin-destination studies telling you that x% of passengers come from this region etc. We could do with the same kind of thing for freight and it would be lovely to have that kind of information because that would really help us to go to the airlines and say there is 20 tonnes of freight that goes past our door every day to London and there is 10 tonnes from somewhere else and actually you could fill a 747 freighter from this airport".

(Manchester Airport Interviewee 1).

For airports in the United States there is more information available to airports, for example census data that shows exports by customs region. However MidAmerica Airport still placed a great deal of importance on obtaining data on the origins and destinations of the freight that is bypassing the airport on truck. The airport has obtained a grant to establish this data and is confident it can enable the targeting of freighter operators based on "evidence" that there is a market for them to succeed.

"At present we don't have any detailed information as to the commodities that are on the trucks or where their origin and destinations are. This information is key to allowing us to target the necessary markets and a study has been commissioned to look into this which will allow for a much more analytical approach to how we target carriers".

(MidAmerica Interviewee 1).

Airports were asked about alternative ways of obtaining data that would allow them to more effectively target-freighter operators. The most direct source of information relating to shipment origins and destinations is airwaybill information which the freight forwarders hold, although obtaining this data was not thought possible due to its sensitive nature.
“Trying to get forwarders to share airwaybill information is not possible because it would give away all their commercial secrets. So ultimately the information from which people make decisions is less precise than it is with passengers”.
(Manchester Airport Interviewee 2).

Even though such information was difficult to obtain for airports, it was felt by one airport that freighter operators could still make informed location decisions as many of them have access to this information themselves through trucking figures.

“For any established airline, not necessarily here, if they’ve got a trucking operation say down to Heathrow or down to the continent, the trucking figures should tell them that there is a market here anyway over time and then it reaches a point when it makes sense to bring the aircraft in”.
(Manchester Airport Interviewee 2).

The fact remains that airports cannot always achieve the ultimate with regards to air service development, particularly in terms of a preferred analytical approach and therefore have to rely on other strategies, such as benchmarking their competitors.

6.3.2.2 Benchmarking other Airports

For airports, particularly those with little cargo experience, comparing performance and learning from other airports is particularly important, and even for the more established airports benchmarking was felt to be an important method to gauge their own performance in the market.

Airports revealed a number of reasons why they benchmark and one of the predominant reasons was as a means to analyse the market and compare how their competitors are performing with regards to air service development and if they have been successful to understand why.

“I’m always benchmarking statistics for our competitors. We know exactly how they are performing and most things we know about our own airport we know about those
we compete with so it’s very important for us. It’s important not only to know how they are doing but, especially if they have been successful, why this has happened”.

(Manchester Airport Interviewee 2).

Learning from other airports with regards to operating a successful cargo airport and working to develop the number of cargo services was important to all airports interviewed and was particularly important for the less established cargo airports.

“We certainly look at what other airports are doing and its certainly important to know your competitors, what they are good at and what they are bad at. Essentially as we are a new airport we have an opportunity to do things a little bit differently and give the airlines what they want but we are also interested in borrowing ideas that have been successful elsewhere and avoiding the mistakes that other airports have made”.

(MidAmerica Interviewee 1).

Nottingham East Midlands and MidAmerica airport’s engage in a more formal type of benchmarking by establishing partnerships with airports sharing similar profiles, with which they do not directly compete, in order to work together on certain issues for the mutual benefit of both airports.

“We talk to other airports with a similar profile, for example Cologne-Bonn. We share common problems and work together to find solutions”.

(Nottingham EMA Interviewee 1).

“We are looking to benchmark in a formal way by establishing partnerships with other airports. As well as the marketing partnerships with some airports in Asia we are trying to develop, we are also looking to establish a security partnership with San Juan Airport, establishing a common set of security practices to speed up shipments”.

(MidAmerica Interviewee 1).

Such benchmarking is particularly useful for airports in order to develop solutions to problems and also to potentially develop a greater understanding of the needs of
freighter operators through shared experiences, which can only help with regards to developing services.

6.3.3 External Influences on Location

This section highlights airport experiences in terms of how influential other industry stakeholders have been in defining the cargo profile of the airport. Whilst freighter operators may declare (for example) that freight forwarders are an influence on their location decisions, airports are also in a position to judge how influential they, and other stakeholders such as passenger airlines, handling agents and shippers are. Furthermore, given the knowledge that freighter operators view these stakeholders as having a certain amount of influence on where they operate, it is important to identify the extent to which airports use any advantage they have in this regard in terms of their promotion.

6.3.3.1 Passenger Carriers

Of the airports interviewed, only one, Manchester, has significant cargo-carrying passenger operations, yet there was a consensus, even among the more cargo-focused airports, that for non-integrated freighter operators a presence of wide bodied passenger carriers was an attraction, especially where the same airline operated both passenger and freighter aircraft.

"Integrators will avoid big passenger airports and that is part of the reason we have had success with this sector. Non-integrated main deck freighters will be drawn to where long haul passenger airlines operate to though".
(Nottingham EMA Interviewee 2).

"We have got some decent long haul (passenger) routes, double daily on some routes and freighter operators have obviously looked at that and seen there is a market and they want to tap into it".
(Manchester Airport Interviewee 2).
As illustrated above, the Manchester Airport representative felt long haul passenger routes, which can often carry significant amounts of cargo, were an influence in that they demonstrated to the cargo community that there was demand from the airport. However in terms of its marketing, the airport believes it more suitable to focus on the existing freighter operators at the airport rather than the passenger airlines.

"Cargo airlines are much more interested to see pictures of freighters being loaded full of cargo than seeing lots of passenger airlines".
(Manchester Airport Interviewee 1).

The situation in which the airports felt that passenger airlines were of the utmost influence was when a potential freighter operator already had a passenger presence at an airport.

"Where I would say passenger carriers are most influential is when you have a situation like we had with Malaysia where they had a passenger operation to Kuala Lumpur here already. That was definitely a factor for them, particularly as they knew exactly what market there was for the cargo capacity they had with the passenger aircraft".
(Manchester Airport Interviewee 1).

"Combination carriers will normally always go into places where they've got a passenger presence".
(Nottingham EMA Interviewee 1).

There are numerous reasons why co-locating passenger and cargo services is advantageous for combination carriers where both divisions operate into the same region. Agglomeration economies for example can be gained in such situations by avoiding the duplication of overheads and it also offers greater flexibility to have cargo carried by passenger or freighter aircraft. For these reasons it was commented that airport authorities trying to separate freighters from passenger aircraft would not meet with a favourable response from the airlines.
“Some big airports are trying to encourage freighter operators to move to their secondary airports, move to Ontario, move to the Southern California logistics airport - no. It is crazy to suggest that combination carriers would want to do anything else than have their passenger and cargo ops at the same airport because not only are you making your operation less efficient, you have duplication of staff and facilities. This may not help us at the moment but that is the situation”.

(MidAmerica Interviewee 1).

The airports were adamant that long haul passenger flights with wide body aircraft at an airport were an attraction for freighter operators, especially if a combination carrier has an existing passenger service. The result was that smaller airports without such passenger service, felt at a disadvantage, even if they avoided the potential side effect of congestion.

6.3.3.2 Concentration of Freighter Operators

Airports were asked about the impact that having a concentration of freighter operators had on their ability to attract new airlines. Each of the three airports has a different profile in this regard but each had experience of how this had impacted on the location decisions of would-be operators at their airport, and clearly felt that a concentration of freighter operators was influential.

“We are getting a critical mass now and as we get more activity it seems to attract even more”.

(Nottingham EMA Interviewee 1).

“Having these high profile freighter operators already at the airport definitely gives us momentum and helps us attract more traffic”.

(Manchester Airport Interviewee 1).

The term “momentum” was used a number of times by airports who felt that attracting one airline made attracting the next airline much easier. Airports felt that locations with a concentration of non-integrated freighter operators were attractive as the
infrastructure and services were in place to handle them, as was the experience. They also felt that freighter operators would benefit from the interlining opportunities that other carriers provided.

"Cargo airlines have a habit of going to legacy airports where freighters have traditionally gone. They know what they are getting there and they know it will work as everything from the forwarders to the transit sheds will be in place and they have greater access to flow markets". (Nottingham EMA Interviewee 2).

It was also felt that an element of competition between freighter operators led to carriers choosing the same locations.

"We've got two carriers here based in the same region and when one came the other followed almost as soon as it was able to because they want to tap into each others market and don't want to lose market share". (Manchester Airport Interviewee 1).

Manchester Airport acknowledged that this can be the case if there is a market for both carriers, but were sometimes reluctant to encourage new carriers that would directly compete with incumbents through fear of diluting loads and potentially loosing both carriers.

"You've got to be careful you don't go and bring somebody in that will upset the carriers you've already got by diluting their business. We've done that on the passenger side in the continuing quest for new tails at the airport. We've done it without stopping and thinking well how is this actually going to affect our existing business? Is it still going to leave enough cake for the others to make enough money from?" (Manchester Airport Interviewee 2).

This related back to the issue of demand and if this demand between certain markets is already satisfied by existing operators then this would potentially be a disincentive for an airline to operate to a particular airport.
Secondary airports tend not to lend themselves to non-integrated freighter operations, not least because the influences described in this section to date are not usually present. However airports have found that an integrator presence at such locations dramatically increases the prospect of attracting non-integrated traffic, although for different reasons than explained above.

"In 1993 UPS came here and DHL took over the running of their heavyweight subsidiary and that's when the overall growth really started and other carriers suddenly became interested".
(Nottingham EMA Interviewee 1).

One of the main reasons why airports see a positive impact from the presence of integrators is through increased recognition from being associated with such worldwide names. Nottingham East Midlands Airport feels it has benefited greatly in this regard from being a hub airport for integrator DHL.

"One thing we have now is that worldwide far more people have heard of DHL and UPS than had ever heard of East Midlands. So if we are talking to someone from China they may not know exactly where we are initially but it carries some weight to say we're DHL's UK hub".
(Nottingham EMA Interviewee 1).

Integrators can also influence growth of non-integrated freighter traffic in a much more direct way.

We have Icelandair operating on Fridays with fish but then that goes on to Liege for TNT and the TNT factor has dragged the aircraft in here although it is a conventional service from Iceland. Bluebird do a similar thing with UPS in the reverse direction, flying Cologne-East Midlands for UPS and then back to Keflavik in their own right so those are two services we probably wouldn't have without the integrator connection”.
(Nottingham EMA Interviewee 1).

These kinds of opportunities demonstrate how existing airline customers can be an important element in attracting new carriers. The increased status airports can receive
from successfully handling freighter services, and the indications this gives in relation to demand and service, can be a catalyst for further growth.

6.3.3.3 Freight Forwarders & Shippers

Airports were asked how important they felt it was to have freight forwarders located at or near to their site for attracting non-integrated freighter operators and also how influential they felt shippers were in determining their location. From the airline interviews it was suggested that airports do not attribute the same level of influence to these two factors, particularly shippers, as the freighter operators do and hence were perhaps compromised in terms of its marketing focus.

There was a mixed response from airports with regards to freight forwarders, with only one of the airports believing them to be a particularly important factor in attracting cargo airlines.

"Freight forwarders are key in terms of attracting new freighter services. We have freight forwarders on our cargo steering group as we want their input and its important that they endorse our airport".

(MidAmerica Interviewee 1).

The other airports were less enthusiastic and did not particularly feel that forwarders could be singled out as a particular influence but more as just one element in what the airport has to offer freighter operators.

"Having forwarders on site is just part of the package really – what’s the airport got. I don’t think they are too important because they are not loyal to any particular airport anyway even if they are here...as for whether they need to be located on site, then I would say as long as they are in this general area then it makes no difference".

(Manchester Airport Interviewee 2).

The issue of forwarder loyalty was raised a number of times with the feeling being that forwarders could not be too influential in airline location decisions because even
if a freighter operator located at an airport with a high concentration of forwarders there would be no guarantee that they would use the services of that airline unless they were the lowest cost option.

"Once airlines are at an airport, local freight forwarders are not necessarily loyal to those airlines but will instead go with the lowest cost option, even if it means trucking long distances. Freight forwarders will do what’s best for their business and to get the lowest price".
(Manchester Airport Interviewee 2).

However one important point was acknowledged in that the air cargo industry is changing and one increasingly common phenomenon is for freight forwarders to have “preferred partners” when it comes to airlines, and it was suggested that the presence of a forwarder for which the airline is a preferred partner at one airport over another could be influential.

"Some of the big forwarders now have preferred carriers and that links together when an airline is thinking of coming here they look at whether their preferred partner is on the airport and can help me sell the cargo".
(Manchester Airport Interviewee 1).

Whilst the opinions on the influence of forwarders were mixed, airports failed to see the influence of shippers on the locations of non-integrated freighter operators, with the argument that the freight forwarders were the customers of the airlines and it is they that decide how freight is transported.

"The shipper doesn’t care how it gets there providing it gets to the place they want it to get to at a good price and they know its going to be reliable. It is the forwarders who are controlling it, shippers don’t have a say".
(Manchester Airport Interviewee 2).

One suggestion raised from the surveys was that airports could and should work with shippers more in order to swell demand. However one problem with this approach is a general lack of knowledge by the airports of who the shippers actually are, and
where the freight is coming from and where it is destined. Freight forwarders control this information which is not released to airports. Hence airports are limited anyway in how they can market to shippers.

"We don't really know what the big shippers in the area are, where they're shipping freight to and where is the freight coming to them from". (Nottingham EMA Interviewee 1).

"I know there is freight that could use this airport because I see it pass my window every day but what we don't know is where it is coming from and going to. If we knew that it would help us to target people for sure". (MidAmerica Interviewee 1).

Freighter operators argue that shippers are influential at minimum in a symbolic way, to signify the extent of the market for airfreight. The airports though felt very much that it is the forwarders who control the freight and therefore shippers are of minimum influence to freighter operators.

6.3.3.4 Handling Agents

In the experience of two of the airports interviewed, handling agents have been instrumental in helping them to attract new freighter services. One of the primary reasons for this is that the larger handling agents may have long standing relationships with airlines through operations at other stations or even have more formal “preferred partner” linkages.

It was felt by one airport that competition between handling agents at an airport was attractive to a freighter operator as it gives them more options (and often lower prices) compared with airports that have handling monopolies or duopolies.

"This is the thing that smaller airports have a problem with in my personal view in that they are not attracting too much non-integrator traffic because they don't have the range of transit shed operators we've got here that the airline operators can
choose from. If you haven’t got it its difficult to sell it. We’ve got 5 transit shed operators here and it’s the big names too so if they have global partners there’s a chance they’ll be here”.

(Manchester Airport Interviewee 2).

Whilst this could be considered an advantage for a larger airport, it is not as directly influential as some of the examples cited by Nottingham East Midlands Airport who have a high profile handling agent with worldwide connections which gives the airport much more recognition than it would otherwise have.

“Certainly the DHL hub was instrumental in getting Cathay Pacific in. Obviously Cathay had a relationship with DHL in the Far East already. They have told us on numerous occasions that the fact that the DHL hub had been built had encouraged them to come here rather than an airport where they have a passenger operation”.

(Nottingham EMA Interviewee 1).

“The facilities DHL have over there are a huge marketing tool for us at the airport and they’ve actually set up a third party handling agent to handle other freighters. They have all their equipment sitting idle for most of the day so they can utilize that”.

(Nottingham EMA Interviewee 2).

DHL’s presence as a handling agent at East Midlands is a side effect of the integrator having a large hub which is under utilized in the day, hence it could be viewed that it is really the presence of an integrator rather than a handling agent which is the real attraction for a non-integrated freighter operator. Either way the idea that airports view handling agents as an important asset for attracting airlines and the fact that this has been a prime influence in reality, is an important finding.

6.3.4 Airport Attributes

In the airline interviews it was ascertained that airport attributes such as congestion, priority afforded to the cargo airlines by airports, and the speed at which cargo can be processed through the airport, were all seen as at least partly influential in terms of
freighter operator location decisions. In the airport interviews questions were asked in order to ascertain how these attributes have affected their ability to attract freighter operators or how they may have benefited by difficulties in this regard at other airports.

6.3.4.1 Congestion and Slot Allocation

The airports interviewed believed that congestion was a significant disincentive to freighter operators, not least because the airlines needed a location where they could possibly undergo future expansion.

"As an airport you have to have space - people are very frustrated at places like New York, O'Hare and Los Angeles right now because there is no room to grow and airlines tell us they want that".
(MidAmerica Interviewee 1).

Airports therefore place a high degree of importance on conveying their congestion-free status to airlines. Airports in the UK outside London consider this as one of their most important advantages over the London airports, all of which have congestion issues either on the ground or in their airspace.

"We do make a big thing about our capacity versus other airports because I think airlines have had enough of waiting 30 minutes to take off and then circling for another 20 minutes to land. Not only are we congestion-free on the ground but our airspace is also relatively uncongested. If you are located in London that puts you in the London airspace and all the delays that can entail".
(Nottingham EMA Interviewee 1).

It was acknowledged by the two non-London UK airports interviewed however that the majority of non-integrated freighter operators would like to operate into Heathrow Airport, regardless of its congestion problems, mirroring what the freighter operators themselves felt in certain markets where the business benefits can outweigh the negative aspects of congestion. Therefore one of the factors most responsible for the
number of freighter operators at airports such as Stansted and Manchester is the fact that Heathrow is slot restricted, preventing new cargo entrants. Both Manchester and East Midlands airports provided examples of how they have benefited from Heathrow's slot constraints.

"About 5 years ago now Cathay Pacific couldn't get the slots during winter at Heathrow that they wanted for a Thursday flight and they actually moved the operation here on a Thursday".
(Nottingham EMA Interviewee 2).

"Malaysia airlines would have gone into Heathrow Airport but they couldn't get the slots and then its just a matter of weighing up the benefits of us against someone else and they liked us".
(Manchester Airport Interviewee 2).

This reveals that congestion, and the inevitable slot restrictions do play a significant role in the geography of freighter operators even if ultimately they don't wish it to and it is these restrictions at the major hubs that are helping regional and secondary airports to grow their cargo activities.

6.3.4.2 Priority Afforded to Cargo

By definition the airports interviewed place a certain degree of priority on cargo and wish to grow this side of their business. The impact of this policy was discussed during the interviews as were the reactions they have experienced from freighter operators to their positive position.

The airports interviewed unanimously felt that many other airports were not interested in cargo and that this handed them an advantage when it came to attracting freighter operators.
"The big passenger hubs just don’t want the freight and as they grow cargo gets pushed out".
(Nottingham EMA Interviewee 1).

The airports felt that having a positive cargo stance and proactively making efforts to secure new cargo services pays dividends over the long term given the close nature of the industry.

"The air cargo industry is very much built on relationships and people in this industry can have a very long memory when they want to, so being freighter-friendly, attending the shows, talking to people and letting them know you are interested does pay off over time".
(Manchester Airport Interviewee 1).

During the interview with Manchester Airport it was felt that a proactive attitude to growing the cargo business had been one of the primary reasons for the airport's success in cargo terms during 2004, particularly as the airport had not enjoyed the same success over the previous two years when it admitted the focus was not on cargo as much.

"We had a big reorganization after buying East Midlands and freight wasn’t at the top of the tree and we just kept it bubbling along nicely and now we have began to focus on it more our throughput has gone rocketing up this year".
(Manchester Airport Interviewee 1).

The reasons why some airports view freighter services with a lower priority than passengers was explored during the interviews and there was a degree of understanding why some airports don’t invite cargo. It was felt that cargo services were not as prestigious for the airport as long haul passenger flights and that freighter flights bring in less revenue for the airport.
"You do have the issue that cargo doesn’t buy anything in the shops. I think the airport generates a lot more money from passenger activity but on the other hand they spend a lot more money on passenger activities as well".

(Nottingham EMA Interviewee 2).

These responses from airports have shown that they feel that a positive stance towards cargo is an important factor in their success and that gaining a reputation for quality from the air cargo community pays dividends when being considered against airports that have previously shown no interest.

6.3.4.3 Infrastructure and Services

It was felt important to ascertain how “freighter friendly” airports have to be in order to succeed with freighter operators, and how much the airports felt the infrastructure they had impacted on airline location decisions.

In terms of infrastructure it was indicated that this did impact on the success of airports hoping to attract freighters. The feeling was that in order to make commitments, freighter operators needed to know that the facilities and support infrastructure and services were in place and not just promised for the future.

"Unless you can offer the infrastructure at the start it lowers your chances. I know of an airport touting for freighters that have got plans to build transit sheds but I think they are going to have to do it first in order to get the carriers in because in this climate no airline is going to commit to coming in for a period of time if the business is not there".

(Manchester Airport Interviewee 2).

This was augmented by the view of MidAmerica Airport – a relatively new facility which had previously had the mentality of waiting for a freighter operator to commit before building a cargo warehouse so it could have an input into its design. However the airport acknowledged that this strategy was not the most appropriate way to attract a non-integrated freighter operator and eventually speculatively built a cargo facility.
"Over the next few years we will also have the facilities in place to serve cargo airlines which we don't have at the moment. I have been talking to a number of airlines who all seem interested if we deliver the facilities."
(MidAmerica Interviewee 1).

These experiences show that airports must make some investments in order to attract freighter operators. During the interviews a number of other services were highlighted as important from the airport perspective in order to maximise their freighter potential. For example airports saw customs services as an important factor influencing their success especially as this is one of the main determinants of how quickly the cargo passes through the airport.

"It's things like customs and excise and we have a dedicated cargo customs operation now which has come along as we have grown and they are quite an asset because airlines look at that".
(Nottingham EMA Interviewee 1).

"The airlines know we have a great customs group here that run a tight operation and the airlines respect that. This works well for the airlines and we're not shy in letting them know this".
(Manchester Airport Interviewee 1).

These responses based on airport experiences confirm that it is important that certain infrastructure and services, especially cargo terminals and a cargo customs operation, are present at an airport in order to attract non-integrated freighter operators. Experience suggests basic infrastructure and service levels are required to succeed as is capacity and a positive attitude to cargo.

6.3.5 Costs

The only cost elements for freighter operators that airports can directly control are the airport user charges, essentially landing and parking charges depending on the nature of the airport. It was important for the research to understand how airports viewed the
locational influence of charges, particularly given that the freighter operators interviewed had indicated that such charges were not as important as had been suggested to date and other costs such as handling, fuel and flying expenses were of considerably greater significance.

6.3.5.1 Airport User Charges

Although all of the airports interviewed offer discounts of varying degrees on their user charges, the indications from the interview responses were that their influence on freighter operators was minimal.

“\text{I would personally doubt how much of an incentive landing fees are. To give one example, Cargolux never paid the slightest attention to the fact that they were operating out of here at peak time, by moving the departure time by half an hour they could have saved half on the landing fee but they never bothered. 16:25 departure was the scheduled time and if they'd gone to 15:55 they'd have got the rebate’’.}

(Manchester Airport Interviewee 2).

This however poses the question of why, if this is the opinion of many airports, do they offer landing fee reductions? Two similar responses appear to reveal part of the reason.

“In terms of the overall costs of an operation the airport charges is a small percentage I think. A freighter operator has to be at the lowest cost possible given the margins are so small to start with though so we think the airlines are still very keen to get discounts”.

(Nottingham EMA Interviewee 1).

“Bringing the fees down would help attract airlines to a degree and we always have to keep an eye on what competitors are doing, but it is the location, the market that is most important because for all of our operators who got an incentive when they first started, when the price has gone up they have stayed because they know the market”.

(Manchester Airport Interviewee 2).
What these two examples reveal is that airports do appreciate the limited scale of airport user charges compared with other airline costs and recognise that compared with a host of other factors, reductions in fees are of much less influence. However the comment that airline margins are small shows that airports recognise that even the smallest of cost variations could have a limited influence. The mention of competitors too shows how airports are not only concerned with attracting an airline but also being more attractive than the other airports in their region.

Strengthening the suggestion that charges were only of very limited influence on freighter operators, one of the airports interviewed offered free landing fees to new carriers. For this airport even waiving landing charges has so far failed to attract non-integrated freighter operators, further demonstrating that freighter operators value many other factors before airport user charges become a serious consideration.

6.3.6 Regulatory and Political Issues

Freighter operators identified regulatory and political issues such as environmental restrictions, bilaterals and political interference as principal factors in constraining their choice of airport as they limited access to certain locations. The impact of this on the airports themselves was therefore explored in the airport interviews in order to identify the extent such issues affect them and how they attempt to overcome these restrictions.

6.3.6.1 Impact of Regulation and Politics on Airports

The impact on airports of imposed restrictions can be severe as they typically vary from airport to airport and country to country and therefore may give one airport a distinct disadvantage with regards to attracting freighter operators. Airports were questioned on how restrictions such as bilaterals, night bans, political involvement, and any other such restrictions affected their ability to develop freighter services. The responses indicated that in many cases they felt severely hampered by such
restrictions, although had typically become resigned to the limitations they have imposed on them.

Restrictions on night time operations is one of the most common limitations affecting airports with regards to cargo, and whilst the airports indicated that 24 hour operations would be an advantage for any cargo airport, they did not feel that this particularly hampered them in attracting non-integrated carriers.

"We do have a lot of environmental restrictions at the airport, although they are not really an issue for the cargo. We have got restrictions at night but they apply to everybody and it's a quota system but all the freighters from Asia come in during the day anyway and would still do even if there were no restrictions".

(Manchester Airport Interviewee 1).

This clearly varies from region to region though, as in order to arrive during the morning or afternoon in Europe, freighters from Asia must leave outside the traditional day time operating hours. As acknowledged by one airport, if the same restrictions were imposed in Asia as are in place at many locations in Europe, then current freight flows would be severely disrupted.

"Interestingly if you end up with a night ban in Europe and a night ban in Asia then you’re stuffed as it leaves you a 2 hour window to operate all your flights”.

(Manchester Airport Interviewee 2).

Therefore night operations for non-integrated freighter operators are important in some regions more than others. With regards to Europe it was explained that there was a lot of confusion regarding the need for night flights for cargo and that it was principally the integrators that required 24 hour operations, whilst non-integrated traffic was typically confined to the day time anyway.
"For us 24 hour operations is key to keep the integrators here. You've got to have 24 hour operations to have an integrator operation. But if you look at the schedules of the heavy freight carriers they operate in the day 9 times out of 10 so it is nowhere near as important for them". 
(Nottingham EMA Interviewee 2).

Perhaps a greater limitation for airports is the restrictive nature of air service agreements which vary between different countries. Within some of these agreements only certain airports may be permitted to be served by some overseas carriers, hence severely restricting the competitiveness of airports not included in the agreements.

"Bilaterals are a big problem but then that problem isn't exclusive to us and most airports have to deal with this. Some airports are in countries that have open skies with pretty much everybody which really helps them and it'd be great to get that here. The real problem is for airports which don't have that but are in geographic proximity to an airport in another country that does. But for us all our competitors face the same problems as us in this regard". 
(Manchester Airport Interviewee 1).

The airports collectively felt that an open skies policy would be the most significant boost they could receive with regards to cargo service development, as it would enable more global routings to be created and therefore mean less reliance on a balanced inbound and outbound load which would particularly benefit smaller airports away from the main hubs.

"Without a doubt liberalizing bilaterals would increase everybody's cargo traffic. It would also eliminate inefficiencies in the system such as having aircraft flying in one direction empty or with a heavily reduced yield. I'd like to see more of those fifth freedom rights available so that a carrier can fly global routings for example from Europe to here to Mexico and have traffic rights on each sector. That would help us attract Asian carriers if they could go from here to Brazil and have traffic rights". 
(MidAmerica Interviewee 1).
Given that in many regions all airports are equally disadvantaged by restrictive legislation, helping overseas carriers to negotiate the red tape which typically accompanies the launch of international flights to new destinations, is something that many airports are using to gain competitive advantage.

“One of the things we're quite good at doing is we've got a good relationship with the Department for Transport so we can offer to help people out with negotiations, and technical issues. There was an issue about the Malaysia flight being operated by the Air Atlanta aircraft but I brokered a deal and got it sorted at the last minute. Also with China Airlines when they came they were a new operator to the country so they had to submit a whole pile of documentation and I was able to get them a list of what was wanted and I helped him at this end so we've got little add-ons like that we offer to airlines”.

(Manchester Airport Interviewee 1).

Airports are therefore still finding ways to distinguish themselves from their competition even in situations where they are equally constrained. What is significant is that not all airports are as constrained by limitations on night movements as previously thought in the literature.

6.3.7 Airport Marketing

The question of how airports market themselves is perhaps the most appropriate for addressing the objective of identifying the main elements adopted by airports to attract freighter operators and whether they are successfully addressing the most important considerations for freighter operators and the questions in this section were designed to elicit this information.

6.3.7.1 Airport Advertising and Promotion

The question of how airports promote themselves to freighter operators and what factors they emphasise was an important theme of the airport interviews. Of the
airports interviewed, each approach was somewhat unique and each airport had a
different opinion as to which factors were important to emphasise. However each
airport did agree that it was important to keep their profile high within the cargo
industry in order to maximise success.

All of the airports interviewed used print advertisements in trade publications, not
necessarily because they felt freighter operators would respond to these
advertisements, but mainly just to keep a high profile within the industry.

"The main marketing effort is at the non-integrated stuff, and we do that through
advertising, we have an advertising budget and we do that through all the trade press
and its really just about awareness, keeping people aware that we're still interested in
cargo, that we want to grow cargo, we've got the facilities and 24 hour operations etc".
(Nottingham EMA Interviewee 1).

In terms of how they chose to focus these advertisements, different approaches from
airports were revealed ranging from a focus on market access to the available capacity
for expansion.

"What we really want to get across in our ads is that we are conveniently located in
the UK both for London and the Midlands, North West, and Scotland, and that we
have the capability to handle all types of freighter operation".
(Manchester Airport Interviewee 2).

"The most recent advertising push we have done has focused on our capacity to
handle pretty much any scale of operation the airline would want to throw at us
because there are plenty of congested airports not too far from here".
(MidAmerica Interviewee 1).

The airports focused on these aspects because they either saw them as their greatest
strengths or they felt that they were the factors which freighter operators were most
interested in, which allows for a comparison to be made between this and what the
freighter operators themselves felt were most important.
Unquestionably the most important marketing opportunity for all of the airports is meeting face to face with freighter operators.

"We do travel to see airlines every now and again if they show a real interest but we like to meet them at trade events such as the air cargo forum, which is another important part of how we market ourselves because if you can sit down face to face then you can sell".

Nottingham East Midlands Airport explained how they exhibited at trade shows along with DHL - a major handling agent at the airport - which allows a freighter operator to gain much more information about prices and terms of operating at the airport. The airport feels this innovative approach and display of cooperation will be attractive to freighter operators.

"In terms of things like exhibitions, we'll be at the air cargo forum and the handling agent over at DHL will be there as well and they'll utilize our stand so if an airline is interested in a new service we can say we're the airport and this is the handling agent and it's a one stop shop and we'll give you a price here and now. So it actually shows that the handling agent and the airport company are working together as a team and I think that comes across well with the airlines because at many airports the airport authorities are very insular and don't really care less about what's going on".

(Nottingham EMA Interviewee 1).

All airports had well rehearsed pitches for meetings with freighter operators, making use of paper-based presentations and in one case accompanying this with a PowerPoint presentation. One airport described how this was tailored to the specific airline when meetings were planned far enough in advance. The contents of the presentation however varied from descriptions of facilities, and existing carriers, to more detailed market evaluations.

"We have a presentation we give when we meet with potential new carriers which is focused on showing them what we have in terms of facilities and cargo handling companies, and we pay a lot of attention to the carriers we already have and we use plenty of photos of freighters. We also show them that we have capacity for growth
and show them exactly where we are located and how easy it is to reach other markets from here”.
(Nottingham EMA Interviewee 1).

“When we meet them we like to open their eyes, informing them of the opportunities that exist in this region and in some cases working to create the markets for the airlines to exploit. We have to make them buy into our location before we show them what a great airport we are”.
(MidAmerica Interviewee 1).

In contrast another airport had actually stepped back from intensive marketing beyond advertisements and trade show attendance, believing that momentum was leading to freighter operators approaching them.

“They tend to knock on our door because over time we’ve built up awareness with the carriers so we don’t need to slog our guts out to try to get these people in. When the volume is going up and we have momentum there are airlines interested in our airport”.
(Manchester Airport Interviewee 2).

In addition to marketing to freighter operators, airports were also asked whether they placed any emphasis on developing the freight forwarder presence at the airport through marketing, given the freighter operators had identified their presence as important in choosing an airport. The response was mixed with one airport saying that they did market to forwarders by sending them information on the airport and including them on a cargo steering group, another believing that forwarders would only come if the airlines were there first, whilst a third airport admitted that they do not market to forwarders but it is something they feel they need to implement.

“We have forwarders on our cargo steering group and we keep all the forwarders in the area informed of what is going on at the airport. The forwarders are the airlines’ customers so it makes sense to get them onboard”.
(MidAmerica Interviewee 1).
“Up until now the marketing effort has been on the airline side to try to encourage the airlines to come in and hopefully that will result in more forwarders. The forwarders only want to be where the airlines are”.
(Manchester Airport Interviewee 2).

“I must admit that the freight forwarders is an area that the marketing effort has not concentrated on at all and I think perhaps we should make more effort towards the freight forwarders and it seems that talking to more and more airlines that freight forwarders are an important part of the chain and if we can get more forwarders to locate here then it got to be beneficial for us”.
(Nottingham EMA Interviewee 1).

This suggests that airports have perhaps not fully realised the potential that a strong forwarder base at the airport can create for attracting freighter operators. On the whole however the airports interviewed appreciated the significance of promoting themselves in order to improve their prospects for attracting non-integrated freighter operators.

6.3.7.2 Incentives

An investigation into the incentives airports offer is a further test of whether they are really appealing to freighter operators. The airports were asked about whether they offered incentives to attract freighter operators and if so what type of incentives they offered. Whilst some airports were initially reluctant to discuss this sensitive issue, all did confirm that they had incentive programmes and provided details of these, as well as their thoughts on their effectiveness.

All of the airports interviewed offered freighter operators a financial incentive in the form of landing fee reductions to varying scales, and none indicated they offered any other type of incentive, although one did indicate they “helped” airlines with marketing, but this was not something that was formally offered as an incentive. At the extreme end of the scale one airport waived airport user charges completely in
order to encourage freighter services and give them a grace period to establish themselves.

"At present we are offering our airport services for free to new operators to help them establish their services and then at very reasonable rates so we believe we can offer an advantage in terms of charges over other airports".

(MidAmerica Interviewee 1).

The other two airports made their incentives time-dependent in that freighter operators could only avail of them at certain off peak times. These reductions however seemed to be more concerned with ensuring flights operated at the times the airports wanted than to actually attract freighter operators in the first place.

"We charge £7.35 per tonne overnight or if your plane comes in and stays overnight whereas in the day we charge £3.50 so its quite a significant incentive in terms of what the airport charges".

(Nottingham EMA Interviewee 2).

"As freighters tend to be more flexible we have off peak times when they pay half the normal rate and most if not all our freighters operate in that off peak band. This has been quite successful, but because they are all in this band which is 6 hours in the middle of the day, all of a sudden we start to get freighter peak".

(Manchester Airport Interviewee 1).

The opinions of the airports as to the impact and necessity for such incentives differed too. Two of the airports felt that offering landing fee discounts was an effective way of attracting carriers if the reductions were substantial enough.

"So we don't shower people with money. Incentives yes. Some people probably do shower money at them I suspect that might be how some freighters have gone elsewhere".

(Manchester Airport Interviewee 1).
The other airport however felt that discounts did not have any significance other than to encourage freighter operators to operate within the times which the incentives were offered, although even then they acknowledged that airlines will only operate at times that suit them.

"I don't think we could offer them anything big enough to get them to come here if that was not what they were already planning. The best outcome is if we can just tweak their timings. But at the end of the day it has to fit their schedules and when we have brought in carriers during the off-peak price band it has been because that is when they wanted to operate".

(Nottingham EMA Interviewee 1).

Although all airports offer incentives, it appeared they do it for different reasons. Two airports believed that such incentives did have an impact on freighter operators' location decisions, although the one which offered them for free had yet to see any reward from this. The other airport was using charge reductions as a device to encourage airlines to operate at specific times and did not believe that alone it would encourage airlines to the airport. The responses also indicated that airports felt that they had to offer some form of fee reduction as that is what most of their competitors are doing, even if they felt ultimately it would not have much of an impact.

6.3.7.3 Airport Views on Marketing

As well as identifying the types of marketing practices airports typically employ, the interviews were also aimed at understanding how airports viewed marketing in general, both in terms of their activities and those of other airports and how they felt they could improve. This was designed to provide a greater insight into the influence airports believe their marketing has and the extent to which they understand the needs of freighter operators.

One strong sentiment to come from the airport interviews which mirrored the feelings of the airlines was that the larger airports did not need to invest in marketing to the extent that the less busy airports did.
"It is very difficult for the smaller airports and they are spending so much money on promotion it is unbelievable. You just have to look at the lavish dinners and events that Vatry airport hosted for the TIACA AGM and that must have really cost an arm and a leg. With a sizable operation it’s easier for us to promote it when you reach this level of maturity than if you’re starting from scratch. Before you reach a level of maturity, with every 100 calls you make one might produce something and then all of a sudden people are banging on your door”.

(Manchester Airport Interviewee 1).

“We know we have to work harder to raise awareness of MidAmerica. Name recognition has been a problem so that puts us at an immediate disadvantage compared with the likes of O’Hare so obviously we have to put more emphasis on marketing than the bigger airports”.

(MidAmerica Interviewee 1).

As was illustrated in section 6.3.7.1, the main benefit from airport advertising and promotion is to project that the airport is enthusiastic towards cargo and to try to ignite interest from freighter operators. The ultimate aim is to develop personal contact with airline representatives and engineer visits to the airport to allow them to fully market their airport. One airport identified how influential such airport visits can be.

“We try to get people up to the airport to have a look round because I think many people don’t appreciate the range of facilities we have here and the focus we do have on cargo. It helps so much if you can get them to see in person what you have and it just gives you something tangible to sell and the airlines always leave impressed”.

(Nottingham EMA Interviewee 2).

The one observation relating to marketing that all airports made was that airports in general are much more interested in cargo than they used to be, hence are engaging in marketing activities aimed at freighter operators.

“The whole marketing climate has changed in the last 5 or 6 years and airports are now so much more proactive in going out into the marketplace trying to get airlines
in. If you go to an exhibition now the vast majority of stands are airports. If you'd have gone 5 years ago there might have been 2 or 3 airports there but it's a much more competitive marketplace we're in now".

(Manchester Airport Interviewee 1).

A concern for airports is that new carriers could take business away from existing ones if there is not sufficient demand. The necessary solution to this is to not only focus on marketing to airlines but also to try to encourage more companies and industries to ship by air in order to boost demand.

"As well as promoting the airport we also need to promote air freight in general in order to keep growing".

(MidAmerica Interviewee 1).

When asked how they felt they could improve there was a feeling from all airports that they were content with what they were doing with regards to airlines and could maybe improve a little by using the same methods more intensively.

The responses prompted the question of how the airports measure success in terms of airport marketing and again the response was universal.

"Our measure of success is new carriers entering the market or volumes continuing to increase. As long as I'm seeing year on year increases in volume that's a good metric".

(MidAmerica Interviewee 1).

What has been shown is that airports cannot keep growing unless there is a market, highlighting that the effectiveness of marketing is not endless and there is a limit to what airports can do, and the airports do seem to understand these limitations. Smaller airports with few airlines have more to gain from marketing to freighter operators but in turn have to expend more resources doing so.
6.3.8 *Airline-Airport Interaction*

The importance of a good relationship between airport and airline has been stressed throughout the interviews and in order to investigate this further, specific questions were asked with regards to the airline-airport relationship to establish why such relationships are important and separately to identify the stages of negotiations between airports and airlines.

### 6.3.8.1 Airline-Airport Relationship

The aim of this section is to gain an airports perspective of the relationship with freighter operators and better understand the nature of this relationship and why it is important to airports. Airports stressed the importance of establishing relationships with freighter operators both in terms of potential new operators and existing carriers at the airport.

"*It's building up a relationship with the operators that is important and that they know where we are*."

(Manchester Airport Interviewee 2).

"*We talk to our existing carriers frequently. There are challenges to them and night flights are an issue and our job is to deal with them in order to keep the carriers here*."

(Nottingham EMA Interviewee 1).

In terms of potential airlines the primary reason for such a level of importance, as suggested above, is so that the airport’s name maintains a high profile with airline decision makers. As suggested in section 6.3.7 this can pay dividends in terms of the marketing of the airport.

"*If we can build a relationship to the point where we can get them to come and have a look around the airport then that's great for us*."

(MidAmerica Interviewee 1).
The behavioural nature of such relationships is difficult to replicate but where these relationships naturally exist they can be of advantage to the airport as well as the airline. Where they do not naturally exist then it is more a case of gaining the trust of the airline through discussion that the airports refer to.

An example of how long standing relationships between an airport and an airline can have an influence on the locations of freighter operators was given by Nottingham East Midlands Airport with reference to the reasons behind Kalitta Air serving the airport.

"The Kalitta flight was a joint venture between the Wallace group in America and IAS in the Netherlands and they set it up at the time Polar were doing a lot of flights from the US to Amsterdam to compete with that. We had a good relationship with the airline's representative in Holland which is one reason why the flight happened out of here".
(Nottingham EMA Interviewee 1).

Nottingham East Midlands Airport also explained how it had been working with a potential freighter operator and stressed the importance of developing a good relationship with the carrier in order to understand each other's needs to make the service materialise.

"We've been working closely with Cargolux for some time to get them to put on a scheduled service from here to Seattle about twice a week. The problem here is that Cargolux might be leaving with a good load out to Seattle but they'd be coming in pretty much empty. So we will continue to plug that and build our relationship with them to try and make it happen".
(Nottingham EMA Interviewee 1).

Whilst maintaining a visual presence at industry events and developing a rapport with airlines over a period of time is important for business development purposes, it was also felt to be important for airports to invest in working closely with existing operators as this not only ensures that existing business is maintained, but also projects positively beyond the airport's cargo community.
“Its working together as a team really, we can help them and they can help us. Maintaining that close relationship is the most important thing. If you can’t satisfy your existing customers than how can you expect to gain new ones, especially in this industry where word tends to get around”.
(Manchester Airport Interviewee 2).

It is clear that a great deal of importance is placed on establishing and maintaining relationships with freighter operators for the reasons stated above, but what of relationships with other industry stakeholders that can influence the locations of freighter operators? Only one airport placed any real significance on maintaining close relationships with forwarders and shippers for example, as they did with airlines.

“We have a cargo steering group which consists of members of the local business community, as well as local forwarders. There are currently 45 members. This input from local business is important as ultimately it is them that we are serving so it is very important to listen to what these folks have to say”.
(MidAmerica Interviewee 1).

The fact that airports generally do not place the same emphasis on relationships with forwarders as they do with airlines is further evidence that not all airports see the value in courting freight forwarders as a means of increasing its overall cargo business. However airports found a good relationship with the airlines to be important in order to maintain a high profile with the airline and to allow both parties to gain an understanding of what the other wants from any future cooperation.

6.3.8.2 Stages in Negotiations with Airlines

Section 6.2.8 identified the stages in the decision making process for freighter operators, and this section looks at the same issue from the airport’s perspective in order to identify the input the airport has and to establish the typical time scale of such negotiations.
Section 6.2.8 showed that the process of choosing an airport often begins long before an airport is involved and in the early stages the airport's involvement is mainly to provide information to freighter operators to enable them to make their decision. However such requests are also an opportunity for airports to become much more involved and have a significant amount of contact with the potential operator.

"In terms of stages, no case is the same as the last, and sometimes it will start with the airline approaching us and other times we'll approach them if we feel the market needs them".  
(Nottingham EMA Interviewee 1).

Whilst there was a clear sense of airports strongly marketing themselves in order to push new services, especially following interest from an airline, airports did acknowledge than an airline must succeed at the airport and therefore cannot be rushed beyond the timescale that suits them.

"We don't go out to bring them in quicker than the normal time it takes. We are talking to another Far East carrier, but again this is not an interest that has developed overnight this goes back two years. They keep their eye on what is going on here, we send them information regularly and in a lot of cases its down to whether they've got the equipment to put on the service. Unless you swap it from somewhere else it's a matter of getting another aircraft".  
(Manchester Airport Interviewee 2).

There are however situations, although described as rare, where the airline has already made its decision and the airport simply has to negotiate terms before the service starts.

"You sometimes get situations where a carrier will approach you out of the blue and six months later they are flying here but that kind of situation requires minimal effort from us when the airline is desperate to start".  
(Manchester Airport Interviewee 1).
The timescale for bringing in a new carrier from when interest is first shown is typically measured in years rather than months though, further demonstrating that the success of airport marketing cannot be measured in the short term.

“It was quite a long process bringing in Malaysia Airlines. It took about three years from when they first started asking questions. What happened was they asked for information, we sent it, then we met them at an exhibition and then as typically happens time passes until they have the capacity to actually put on a flight. Then you hope they’ve done their homework in terms of the market, because we know they were talking to other airports. Again it’s just about keeping them informed and if they are interested they’ll come”.
(Manchester Airport Interviewee 1).

“I do a lot of international travel, I spend a reasonable amount of time on the road meeting with airlines but we realise it can take 3-5 years to get some of these airlines in”.
(MidAmerica Interviewee 1).

Three years is therefore not an uncommon timescale and this period is not intense by any means with occasional meetings and information sharing from the airport’s perspective. However nothing can happen until the airline is ready both from a business perspective. This is often also a period for problem solving as Manchester Airport described in one case.

“Because the airline couldn’t get into Heathrow I know for a fact they were looking at Stansted because one of the interesting things they were worried about at Manchester was “where’s that?” Would shippers or forwarders know where it was? They thought the forwarders would be a little wary not seeing the name London as the destination but seeing somewhere else. Those are the kind of issues that crop up and we try to resolve in this time period and in this case we obviously did that and they saw that there was a market here”.
(Manchester Airport Interviewee 1).
From the airport's perspective the stages in bringing in a freighter operator may begin a number of years before they show any interest in the form of marketing and informing the airline of the airport. However once an airline shows an interest it is still a long process but one in which the airport typically plays an important role in terms of meeting with the airlines and fostering trust. This was found to be important as in the experience of airports, if the airline trusts them then their chances of success will be much greater.

6.3.9 Summary of Significant Findings

The airport interviews have contributed greatly to an understanding of not only the primary factors that lead to freighter operator location decisions, but also the processes and the role of the airport within that decision, along with the airport viewpoints necessary in order to evaluate the effectiveness of airport marketing vis-à-vis freighter operator requirements. Summarised below are 7 significant findings from this section.

- Airports acknowledged that demand was the primary factor that determined their success, together with efficient access to the airport from these markets. However, airports felt somewhat restrained in using demand to target freighter operators due to the difficulty in obtaining origin-destination data for freight movements in their region.
- Airports generally had a good feel for what freighter operators want from an airport and used this in their marketing. For example there was an emphasis on relationships from both parties and airports that were able to, promoted their existing freighter services, which the carriers themselves felt was an important decision making factor.
- There were areas of contention too. For example airports felt the influence of freight forwarders on airline locations to be limited as their presence is no guarantee that they will be loyal to that airport. It was however acknowledged by airports that this was one area in which they could improve their marketing, given that forwarders could be seen as a symbolic indication of demand.
Incentives were viewed as important by airports but there was a distinct emphasis on up front incentives such as landing fee reductions, as opposed to incentives such as marketing assistance more favoured by airlines. Airports did not see incentives to be of a great deal of influence on freighter operators and merely allowed them to compete with rival airports.

Airports acknowledged that the larger airports with freighter operators already present were in a much stronger position to attract further operators. There was a strong feeling that freighter operators are attracted to the main gateway airports, although the presence of an integrator hub was another factor that was seen as making a secondary airport viable by offering support services and a bank of connecting flights. There was also a feeling that in future there would be a natural drift away from the major gateways as passenger-prompted congestion limited freighter slots.

Airports recognised that the marketing climate had become much more competitive over the past five years and airports now have to be more proactive, particularly those with few or no existing services. This has brought new choices to airlines and more opportunity for the airport to play a role in determining where freighter operators locate.

Airports confirmed from experience that attracting cargo airlines is a long term process, with three to five years not uncommon. This emphasises the importance of relationships and the need for airports to exercise a degree of patience and view success and failure in the long rather than short term.

These airport interviews have provided a platform for which to make recommendations on how airports can improve their chances of attracting non-integrated freighter operators and provides another source of evidence to determine the factors that influence the locations of such carriers.
6.4 Conclusions

The interviews with airlines and airports were focused on interpretation of the initial findings from chapter 5 as well as providing a more open forum for both parties to convey their experiences with regards to either choosing an airport or working to convince airlines to do so. In order to make recommendations to airports regarding their methods to attract freighter operators, it is important to first understand their current practices and this chapter has provided a platform from which to do this.

One firm conclusion from this chapter is that demand is the primary factor that drives the locations of non-integrated freighter operators in terms of identifying regions in which to operate. Manufacturing clusters of airfreight-friendly, typically high-technology goods, were seen as a strong indication of demand. It was however seen as important to assess whether demand was already met by existing services from competing carriers. From a theoretical perspective agglomeration economies are gained by freighter operators from locating with other such carriers and passenger carriers through economies of scale, although the evidence reveals this to be more of an output from the decision rather than an input into that process.

It can also be concluded from the interviews that the total cost of operating to a particular airport is a primary determinant of which specific airport within a region is chosen, providing it can offer access to the pockets of demand that first prompted the airline to focus on that region. Airport user charges alone were shown to have little influence in isolation. With regards to airport operations, handling charges are a greater proportion of costs, but the greatest single cost is fuel, with one airline estimating this at 45% of total costs. This led to the identification of flying time from point A to point B as an important part of the overall evaluation.

There are a small yet significant number of areas in which airports have miscalculated the impact of certain factors on freighter operators' location decisions and therefore misdirected their marketing. One such example was with regards to the offer of incentives to freighter operators. The carriers felt it was more important to receive assistance in developing their services and gaining market share, for example by offering marketing assistance, rather than what was typically offered which was a
short term gain from a reduction in landing fees. Similarly the importance of locating at freight forwarder bases was highlighted by the freighter operators yet the evidence from the airport interviews suggests that airport efforts to attract forwarders are minimal and therefore an area for many airports to focus.

Significantly airports can also enhance their freighter prospects through engaging with the handling agents that operate on their site, cooperating with them on marketing to offer ‘all inclusive’ price quotations. Both airlines and airports identified handling agents as influential in location decisions either as a result of the rates they charge or due to a link with the airline. By working with the handling agent, airports can more effectively market on price and also convey information on handling to airlines that would otherwise not be available ‘up front’, a strategy which has demonstrated success at Nottingham East Midlands.

Such improvements to airport marketing actives are particularly important given the consensus that airports can influence the locations of freighter operators through marketing. Whilst advertising could perhaps be considered merely a symbolic gesture of a willingness to host freighter aircraft (itself found to be important), more intimate, relationships based marketing was found to be effective over the long term. In this regard it is important to conclude that for airports, courting airlines can be a long term process. However, the degree of airport influence must be considered relatively and the freighter operators would not operate to a location that was not right for them with regards to demand. It was clear though that airlines are willing to engage with airports and listen to what they have to offer with the message being that patience and perseverance can pay dividends.

This chapter and its predecessor have produced some clear findings with regards to freighter operators’ location decisions and the effectiveness of the airports in catering for them. Chapter 7 now focuses on the process of such decisions.
Chapter 7 - Case Study

7. Case Study: DFW Airport and China Cargo Airlines

7.1 Introduction

Having established the main factors influencing non-integrated cargo airlines' choice of airport and why they are important in chapters 5 and 6, this chapter is concerned with how these factors are used to choose an airport and how an airport can successfully position itself to attract airlines based on many of these factors. This is achieved through the study of the recent case of China Cargo Airlines choosing to operate to Dallas-Fort Worth (DFW) Airport which not only demonstrates the factors that went into that particular decision, but importantly highlights the process of the decision, and particularly the airport's role in positioning itself to attract airlines through a marketing-led approach.

The primary data source for this case is derived from interviews with both the airport and the airline. In both cases a single, in-depth face to face interview was conducted with the relevant personnel directly involved with the case as described in section 4.6.3. Further to the detailed information sourced from the interviews, documentary evidence was provided by the airport in the form of confidential marketing material tailored to the relevant freighter operator, as well as publicly available marketing literature, press releases, articles from trade serials and airport planning documents. Furthermore direct observation was of value both from visiting the airline and the airport site and from observing the airport's marketing practices at the 2004 Air Cargo Forum.

This chapter is structured to reflect the process of an airport working to attract cargo airlines and the decision of one airline to locate services there. The chapter therefore begins with a background to the companies involved, examines the cargo environment in relation to the airport and the airport's methods to ignite airline interest, as well as studying the airline's path to choosing an airport and how the two came together when China Cargo Airlines began services to Dallas-Fort Worth Airport.
7.2 Case Background

Located between the Texas cities of Dallas and Fort Worth, DFW Airport serves the ninth largest metropolitan area in the United States (GDC, 2003), and is the world’s third largest airport in terms of land mass with 18,706 acres and eight runways. Of this, over 2000 acres are dedicated for air cargo facilities and the airport handles 60% of all cargo in Texas (DFW Airport, 2005a) equating to 742,289 tonnes in 2004 (ACI, 2005).

With its significant passenger services, including being the home airport of the world’s largest airline, American Airlines, passenger aircraft carry 29% of the airport’s cargo, although this share has been steadily decreasing since the start of the decade (DFW Airport, 2005b). Non-integrated freighter operators are leading the cargo growth at the airport and in 2004 accounted for approximately 24% of the total cargo that passes through DFW, although this is still only half of what the integrated carriers handle.

The growth in cargo has materialised as a result of a drive by the airport since 1997 to grow this side of its business. This is explained in the airport’s 1997 development plan which called for “an aggressive and targeted marketing programme designed to increase air cargo services at DFW Airport” (DFW Airport, 1997). As explained during the interview with the Assistant Vice President of Air Services Marketing (see appendix J for questions), this was accelerated post-2001 when the airport’s passenger numbers ceased growing.

"The airport has decided that cargo is a strategic imperative and we are not going to be just a passenger airport. With the downturn of the passenger industry experienced over the past 3 years there was a great focus put on cargo. Cargo seems to be the profitable side of the business for airlines ...".

DFW Airport has embraced marketing as an important method to attract cargo airlines and has been one of the most successful airports in the US in the past four years at developing non-integrated freighter services measured by the number of new carriers.
Chapter 7 - Case Study

The airport grew its cargo business by 12.5% in 2004 with all the growth coming from international freighter routes (DFW Airport, 2005a).

China Cargo Airlines was established in 1998 by China Eastern Airlines and China Ocean Shipping and is based in Shanghai. The airline has a fleet of six McDonnell Douglas MD-11s together with leased Boeing 747 freighters. China Cargo Airlines also operates the belly space of China Eastern Airlines' passenger flights, making it a significant combination carrier, although China Eastern does not fly into any airports in the Southern USA.

China Cargo Airlines has operated freighter services to the United States for many years, although has flown only to the major Asian gateways of Los Angeles, San Francisco and Seattle on the west coast, as well as Chicago and New York. The airline began services to DFW Airport in February 2004 with a thrice weekly service using MD-11 aircraft, after an evaluation of all the major airports serving the Southern United States. The airline’s status as one of the most recent additions to DFW Airport’s list of freighter operators, together with the fact that a number of other airports were considered, makes this case particularly suitable for identifying the processes involved in an airline choosing an airport to serve as per objective 5 of this thesis (see section 1.3).

7.3 DFW Airport’s Position in the Air Cargo Market

In order to provide an understanding of DFW Airport’s credentials to attract freighter operators it is important to establish exactly where the airport fits in to the air cargo hierarchy in the greater region it serves.

As the previous section explained, the airport is a major passenger airport but is a lesser established airport in terms of non-integrated freighter services – a sphere of operations it only began to actively attract in 1997 (although such carriers were present at the airport).
Whilst being one of the busiest airports in the world, due to its size, there are no constraints on development that other busy airports typically encounter. The airport is not slot coordinated and doesn't have noise or any other constraints on doing business.

As of December 2004 the airport had seven major international non-integrated cargo airlines operating regular scheduled services, with two of these being added in 2004. An eighth freighter operator has subsequently begun services. Of the seven major non-integrated freighter operators serving the airport at the time of this study (including China Cargo Airlines), five are Asian-based carriers with the other two based in Europe. With these five Asian carriers, all of which operate large wide bodied aircraft on multiple weekly frequencies, DFW Airport has become a significant Asian gateway to the United States.

Whilst DFW Airport does not restrict itself to such carriers, it does focus much of its marketing attention on Asian carriers as the industry around the airport is compatible with the industrial strengths of Asia, as described during the research interview.

"The DFW Metroplex area has a very high-tech industry and is therefore great for Asian imports".

The airport has therefore positioned itself as an Asian gateway based on the industry in the DFW Metroplex area and the airport was therefore particularly focused on attracting China Cargo Airlines.

For an airline such as China Cargo Airlines which is already established at the Pacific coast airports, there are logistical and trade advantages from operating additionally to DFW, such as a reduction in overland shipping, but many of these advantages could be replicated at a number of airports such as Houston, hence part of the airport's success must be attributed to the importance it places on attracting such services, particularly as Asian cargo grew by 142% from 2001 to 2004 (DFW Airport, 2005c), a period when the airport began to focus much more on cargo than it had done at any previous time.
Whilst DFW is increasingly becoming a major freighter airport, it is not (in the feeling of the airport) in the position of other airports such as Los Angles, San Francisco and Chicago in terms of name and market recognition by overseas airlines, hence there is more emphasis on the airport to actively attract freighter operators, which manifested itself during the research interview:

"Whilst most international airlines know of Texas they are often unsure of the geography of Dallas and Fort Worth and the demand opportunities at the airport. (Therefore) we spend time educating potential operators about where Dallas and Fort Worth are, what the attractions are, what is the business and where is the freight going".

The potential for passenger operations to assist in the development of freighter services was also discussed. Passenger and cargo services were described as "very complementary" and the airport was enthusiastic about the advantages for combination carriers co-locating their passenger and freighter services:

"People want to be where the passenger traffic is, they want to be where their passenger operations are if they have one, because you are duplicating overheads if you have to open a second station, as opposed to a few offices".

The airport does have a number of passenger services from European and Asian carriers and sees those who also have freighter aircraft as prime targets. Lufthansa for example had a passenger operation at the airport before it decided to commence freighter service, and Korean Air began both passenger and cargo services at the same time, demonstrating examples of the influence this can have for combination carriers.

DFW Airport is an example of an airport that possesses many of the factors that chapters 5 and 6 have shown to be important in an airport such as a concentration of freight forwarders, other cargo carriers, unrestricted operations and a willingness to actively attract non-integrated freighter operators, yet it is not an automatic choice for many carriers, making it such a suitable airport to focus on in this thesis.
7.4 Asian Air Cargo Demand

Section 7.3 described that DFW Airport has placed a particular focus on attracting Asian airlines. The health of the air cargo industry is very much linked to that of global and regional trade, and in the combined metropolitan areas of the cities of Dallas and Fort Worth (collectively known as the Metroplex), there is a large cluster of technology firms that have links with Asia which is why the airport has seen freighter operators from this region as the linchpin for its success. This case is a prime example of the impact industrial clusters can have on the location of non-integrated freighter operators and the airport certainly feels this is an important factor and devotes much of its marketing and discussions with airlines on conveying the airfreight-friendly industry in the local area.

The Dallas/Fort Worth Metroplex is the third largest technology employment centre in the US (GDC, 2005), home to technology companies such as Texas Instruments, Radio Shack, Cisco and Southwest Bell as well as the US headquarters for major overseas companies such as Nortel, Nokia and Erickson. The most pronounced cluster in the metroplex is the ‘telecom corridor’ in Richardson where a large number of telecommunications companies are headquartered. In total more than 80,000 companies are located in the Metroplex with 19 Fortune 500 businesses headquartered there. The region’s manufacturing strength is demonstrated by the fact that its 2002 GDP of $250 billion would place it 19th among the world’s nations (GDC, 2003). Much of the technology development has occurred within a 20 mile radius of the airport prompting Arend et al. (2004) to identify Dallas Fort Worth Airport as one of the clearest examples of an aerotropolis taking shape in the US.

It is no coincidence that DFW Airport has had more success attracting cargo airlines from Asia more than any other region. The airport has made it a strategic imperative to bring in carriers that can help to grow the local economy and has focused on targeting specific groups of carriers. Asia is by far the largest market for the airport in terms of the trade with the Metroplex area and subsequently the number of flights

1 Ranking of the United States’ largest companies compiled by Fortune magazine on the basis of 2003 revenue.
operated, and the statistics show why the airport is targeting such carriers. The seven largest trading partner countries with the Metroplex are in Asia, with China and South Korea the leading partners (GDC, 2005). Figure 7.1 shows the 10 largest trading partners for the DFW metroplex in terms of total (import and export) trade.

![Figure 7.1: The top 10 international trading partners for the DFW metroplex in 2003. Source: GDC (2005).](image)

In 2003 the DFW metroplex totalled $22.66 billion in imports by value and $12.25 billion in exports. The largest trading partner in terms of imports is China whilst the top trading partner for exports from the region is the Philippines (GDC, 2005). The combined $35.1 billion accounted for 35% of the total trade of Texas, which is the top exporting state in the U.S. (GDC, 2003). This data clearly shows why DFW Airport is targeting Asian carriers, and particularly those serving mainland China.

One principal finding from chapter 6 was that such industrial activity does not necessarily equal excess air cargo demand if current freighter services are adequately meeting it. However whilst the airport had four Asian carriers operating prior to China Cargo Airlines commencing service, it was described in the interview with
DFW Airport that this demand has still not been met with the addition of China Cargo Airlines.

"There is a lot of pent up demand here. And you can even look at the macro statistics right now. For example trade with Asia, there are days of backlog. There are 2 million kilos at Seoul right now, waiting to cross the Pacific. That's 10 flights worth which is pretty amazing. That's a lot of cargo backed up ready to go".

These statistics and this demand show that the airport is equipped to attract new cargo airlines, but it still has to compete for new services with other airports with similar profiles and for this purpose the airport uses marketing to ignite interest from freighter operators. With a large technology cluster this case is used as a prime tester of the theory that clusters of industry are attractive to freighter operators.

7.5 Igniting Airline Interest

What sections 7.2-7.4 have shown is that DFW has the demand and the facilities to attract non-integrated freighter operators but does not necessarily have the name recognition of many of its competitors leading to a greater reliance on marketing than some of its piers.

The airport has a number of methods intended to develop an initial interest from freighter operators that will allow them the opportunity to develop a relationship and to implement its more detailed, quantitative marketing approaches. Table 7.1 summarises these methods.

The focal of the print advertising is particularly telling in terms of what the airport feels it needs to convey to freighter operators in order to boost its profile. Two distinct advertising campaigns featured in Air Cargo World during 2003 and 2004, the first of which focused on the business profile of the DFW Metroplex and the space the airport has for expansion. The second campaign focused on the growing number of freighter operators at the airport and its position as one of the fastest growing major
air cargo gateways. Both of these themes were found to be very important to freighter operators in the literature review.

<table>
<thead>
<tr>
<th>Marketing Tool</th>
<th>Purpose</th>
<th>Specific Focus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advertisements in trade serials (e.g. Air Cargo World)</td>
<td>To foster awareness of cargo operation &amp; boost cargo profile</td>
<td>Incumbent cargo airlines; Metroplex economy &amp; trade; uncongested - room for expansion.</td>
</tr>
<tr>
<td>Presence at trade shows (e.g. TIACA Air Cargo Forum)</td>
<td>To meet airline decision-makers &amp; boost cargo profile with marketing stand</td>
<td>Details on the specific location of the airport; incumbent cargo airlines &amp; routes; Infrastructure.</td>
</tr>
<tr>
<td>“Inside DFW Cargo&quot; book</td>
<td>To provide specific information about cargo operations at the airport</td>
<td>Details on infrastructure, airport scale, trade data between key markets &amp; existing cargo companies</td>
</tr>
<tr>
<td>DFW cargo interactive CD-ROM</td>
<td>To provide details on cargo operations and future growth in an interactive format</td>
<td>Details on airport location, infrastructure, size compared to other airports &amp; current operators.</td>
</tr>
<tr>
<td>“Operating at Dallas/Fort Worth International Airport&quot; booklet</td>
<td>To inform of the terms of operating at DFW &amp; services available</td>
<td>Details on different charging structures, discounts &amp; support service suppliers (e.g. fuel)</td>
</tr>
</tbody>
</table>

Table 7.1: Methods and tools used by DFW Airport to market the airport.

The most important and effective form of marketing though in the experience of the airport is to attend and have a presentation area at trade shows where cargo airline representatives will be present. DFW attends “1 or 2 cargo trade shows per year” and for the airport the key to this stage of promoting awareness of the airport is to make contact with airline managers and develop relationships. As was made clear in the interview, “This is a relationships business, the more you know people, the more you get your name out the better”. The airport feels trade shows such as the Air Cargo Forum (ACF) are the most effective way of initiating such relationships which can then be developed into further discussions and reciprocal visits.
"The TIACA ACF pays off very well for us. We use our membership for networking, to keep a pulse on the industry and you get every airline there and a lot of very smart people. We did some great business at the 2004 ACF ..."

Trade shows such as the ACF are one medium for the airport to distribute its other general marketing material summarised in table 7.1. The "inside DFW cargo" book focuses on all aspects of the airport's air cargo operation such as its location, scale, aeronautical infrastructure, cargo infrastructure and cargo growth figures, together with a directory of current airline operators, forwarders, handlers and other relevant support services. The main focus of the book however is trade statistics, which the airport views as its key marketing tool, and in particular trade between DFW and each world region.

The CD-ROM has the same focus in an interactive format, showing trade statistics, airport growth figures, maps, a cargo video to showcase the airport, and website links that provide up-to-date statistics. The cargo video focuses on the size of the airport, the cargo throughput, the local economy, cargo facilities and support services.

The airport has a further booklet which it makes available at trade shows which focuses more on the specifics of operating at the airport, listing charging structures, terms and conditions of operating and contacts for relevant support services such as fuel suppliers, all intended to give an idea to potential new carriers of how the airport operates.

This section has shown the methods DFW Airport uses to establish interest from a cargo airline. The effectiveness of this can be measured in terms of the number of carriers that contact the airport for further information or for the expressions of interest that airlines show in the airport. As chapter 6 demonstrated, alone these methods cannot convince an airline to choose an airport, but they are an important bridge for both parties to make contact and for discussions regarding a possible service to take place. The next section describes what led China Cargo Airlines to become interested in serving DFW Airport and shows how effective the above marketing was in this particular case.
7.6 China Cargo Airlines: Search for a new US Airport

During the interview with the North American Regional Manager of China Cargo Airlines the question was asked of exactly how the airline became interested in operating to DFW Airport (see appendix I for full list of questions).

With China Cargo airlines already operating to Los Angeles, San Francisco, Seattle, Chicago and New York, the airline, in mid-2001, began exploring alternative airports in the United States for possible expansion as its existing routes were proving successful. At this time the focus was on airports serving the southern US market as analysis was showing that many consignments flown to Chicago were being trucked south. However this was adding to the time taken for consignments to reach their destination and was therefore less practical for shippers of time-sensitive goods when compared with the growing number of Asian carriers that had recently begun to serve Atlanta, Houston and DFW.

Although the airline was not in an immediate position to expand its network in the US due to issues such as aircraft availability, the airline did make enquiries about fees and requested general information from a number of US airports, as it would routinely do both for reference and to aid in future location decisions. Through its US office, China Cargo Airlines identified the airports which might be suitable for service and DFW was one of the airports that the airline contacted.

As for why the airline decided to contact DFW Airport, it was known to the airline’s US office which was making the initial enquiries primarily due to its status as one of the busiest passenger airports in the US. The regional manager acknowledged that he was not aware of the full extent of the airport’s air cargo credentials at the time or the extent of the demand between the DFW Metroplex and Chinese cities, although he knew there was demand from the Southern US region as a whole, of which some was from the DFW area. What prompted China Cargo Airlines to view DFW as a viable option was from looking at where their competitors were flying to in the southern United States. At the time (mid-2001), Singapore Airlines Cargo had just announced their intention to serve DFW which attracted publicity for the airport. This was the main factor cited by China Cargo Airlines for making an initial contact with the
airport for information, although it was acknowledged that the airline would probably have contacted the airport anyway given its location, although perhaps with lesser interest in following this through.

DFW Airport's initial response to the request for information from China Cargo Airlines was to send them the charges information they requested along with the "inside DFW Cargo" book, the interactive CD-ROM and the "operating at DFW" booklet, as described in section 7.5. Whilst not making specific reference to the above material, China Cargo Airlines commented that the literature that was sent to them was particularly informative with regards to conveying the enthusiasm of the airport to attract their services: "We could see that the airport had a real interest in working with us ... which of course is important". It also showed them that there was sufficient demand in the DFW Metroplex for a direct service linking the region with China, which was the focal point of the airport's response to China Cargo Airlines' request for information.

7.7 A Successful Marketing-led Approach

7.7.1 Initial Response to the request for information

From the airport's perspective direct cargo service to China had become a "strategic imperative" and therefore saw the routine request by China Cargo Airlines as an opportunity to develop such a service within the aggressive and targeted marketing programme of their development plan. China Cargo Airlines was one such carrier the airport decided to target and focused on ensuring that when the airline was ready to expand that DFW was the airport chosen.

In any situation where an airline shows an interest in DFW, the airport's primary aim is to get airline representatives to visit the airport, as was highlighted during the research interview: "If I can get them on my turf then I can sell". This was particularly important for the airport as it was in competition (as it often is) with Atlanta and Houston – two airports with similar characteristics.
After sending the information China Cargo Airlines requested on fees, together with supporting material, the airport began to research the carrier, its main markets, and trade data between the DFW Metroplex and these markets, in order to develop a tailored business case presentation. This is the main method used by DFW Airport to attract freighter operators and contains information specific to the airline on why they should choose DFW: The airport finds this approach most effective when delivered in person and therefore in the months following China Cargo Airline's request, DFW Airport began making telephone calls to initiate a meeting in Shanghai with the Vice President of cargo at the airline.

7.7.2 The development of negotiations with China Cargo Airlines

The process of a freighter operator developing a new service at an airport is typically a long term one and it was revealed during the airport interview that it can take 3 to 5 years of discussions to gain service from some airlines, as was the case with China Cargo Airlines, which took just under three years. During this time DFW Airport feels it is very important to be proactive in maintaining contact with the airline and moving the process along.

"I won't say we do it the hard way but we do go after it. You have to be willing to work with the airlines, you have to spend time with them and get to know them. You can't just make a phone call and expect people to come or send a letter. You generally have to go to their turf, sit down and talk to them and find out what they are really looking for”.

One of the key stages for DFW Airport in terms of developing freighter services is having the opportunity to meet face to face with the airline decision makers and to present the case for the airport and this was seen by both parties as a key moment in determining whether the airline and airport can work together. Once the airline had made an initial contact with the airport, it took four months for the airport to establish a meeting with the airport (see figure 7.2 later in this chapter for the timeline).
In this instance the airport's Assistant Vice President of Air Services Marketing visited the headquarters of China Cargo Airlines in Shanghai to meet with the Vice President of Cargo and the airline's Operations Director. From the airport's side the philosophy is "if somebody shows an interest I'll go and see them". Such meetings provide the airport with an opportunity to sell the merits of their operation and provides the airline with the chance to discuss issues such as fees and incentives in detail. Most importantly for the airport though these meetings are about "building a relationship, getting comfortable with each other and ensuring nobody was blowing smoke at each other".

7.7.3 Business case presentation

For DFW Airport the main focal point of meetings with airlines is their business case presentation which is a tailored and quantitatively focused visual and document based presentation outlining the specific benefits for the airline of operating at DFW. In this presentation the airport makes heavy use of US Department of Commerce Bureau census data which shows imports and exports by customs district and benchmarks statistics for other airport against DFW. They have a computer model which allows them to look at any country in the world and compare it amongst the customs districts, so they can say for example that they have more imports from Shanghai than Atlanta would, which helps them to compete against other airports.

Table 7.2 displays a summary of the content of the business case presentation as well as an explanation of the purpose of each section in relation to its aim of persuading China Cargo Airlines to operate to DFW Airport.
<table>
<thead>
<tr>
<th>Heading</th>
<th>Contents</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airport Overview</td>
<td>Airport location; Aeronautical infrastructure; Airport capacity; Airport rankings; Route network.</td>
<td>Demonstrate that DFW is a major airport with no restrictions that already serves a number of carriers successfully</td>
</tr>
<tr>
<td>Cargo Infrastructure</td>
<td>Overview of existing cargo terminals plus future expansion plans; Lists major forwarders.</td>
<td>Shows airlines that the airport can handle any size of operation with a strong customer base and can grow to meet future demand.</td>
</tr>
<tr>
<td>Market Demographics</td>
<td>DFW based Fortune 500 companies; High-tech export companies; Population growth.</td>
<td>Demonstrates DFW has a hi-tech economy led by respected firms suggesting plentiful movement of air freight-friendly goods.</td>
</tr>
<tr>
<td>Regional Trade</td>
<td>Commodities between Asia and DFW; Traffic figures between regions; Onward connections.</td>
<td>Specifies that there is a growing market at the airport for the airline to serve and is stronger than at other airports.</td>
</tr>
<tr>
<td>Cargo Performance</td>
<td>Airport growth figures focusing on Asia; Studies of existing carriers and their growth.</td>
<td>Demonstrates that other airlines are succeeding at the airport suggesting the new carrier can have the same success.</td>
</tr>
</tbody>
</table>

Table 7.2: An overview of the DFW business case presentation.

Much of the business case presentation follows key areas of location theory as well as addressing factors described as important to freighter operators in chapters 2–5 and 6. For example the presentation begins by providing an overview of the airport, addressing the location within the United States and the incumbent carriers at the airport – something that is theoretically important with firms having a tendency to locate together as shown in chapter 3.

DFW Airport has approximately 200 freight forwarders on site and conveys this in its presentation, naming the main players at the airport to express linkages to the wider air cargo community. However during the research interview it was found that DFW sees shippers as a more influential marketing tool than forwarders:

"We need the airlines to see the demand in terms of the shippers. The forwarders are going to use whichever carrier they can get the best rate on. But on the other hand if
you have shippers that say they want the freight to go to certain destinations that are not served we can work with that”

By using both the names of major shippers and forwarders the airport can convey that there is demand for cargo and a means to access that demand. In the case of China Cargo Airlines local technology companies were very keen to have a direct service to mainland China. For example a mobile phone manufacturer specifically wanted service from China to allow them to move inventory much quicker to a warehouse close to the airport. This was an example used by the airport during discussions with the airline and such testaments were described by China Cargo Airlines as a “very encouraging indication that we could be successful at DFW”.

The focus on market demographics and trade between the DFW metroplex and China was described as the most important stage of the presentation by the airline given the importance demand has on whether a service is viable. Major companies are named in the presentation and particular interest is paid to those with worldwide operations who are involved in importing and exporting goods to build an economic case for the airport.

For DFW Airport marketing is bottom-line orientated, adopting a very analytical approach, and this is conveyed in the trade analysis which makes heavy use of statistics to express the opportunities at DFW. Particular emphasis is on import and export data for high-yielding commodities and on the growth of Asian cargo at the airport over a 10 year period and a comparison of growth between DFW and competing airports. The status of China as DFW’s largest trading partner was a particular focus for the presentation given the audience as were the import and export growth figures between the two regions.

Specific connecting market opportunities for the airline are explored, both in terms of domestic road feeder opportunities to nearby cities, and particularly air links between DFW and Latin America and Mexico with examples of cargo transiting through DFW from Latin America onto Asia on existing carriers being used. One of the key decision making factors for the airline was for an airport to have direct connections to Latin America. There is a growing market for trade between Asia and Latin America.
and offering their customers connections through a US gateway is the most efficient way for them to serve this market given the extreme distances between China and Brazil for example.

As well as emphasizing the connections available beyond DFW, the airport also researches demand to airports beyond the airline's gateway, in this case Shanghai. Their freighter network to other Asian destinations was explored and then DFW catchment area volumes (sourced from the US department of commerce) to key destinations served by the airline are used as part of the presentation. In the case of China Cargo Airlines Japan and Hong Kong received particular attention due to their technology exports. By providing information on both origin and destination connecting demand, the airport is providing the airline with a factual, sourced case stating that there is sufficient demand for this particular carrier which the airline itself can then investigate.

As well as the potential cargo volumes and benefits for China Cargo Airlines operating at DFW, historical growth in cargo is discussed as the final stage of the presentation and attention is given to the performance and growth of existing freighter operators at the airport, many of whom are direct competitors of China Cargo Airlines to certain markets. For example the growth of China Airlines is highlighted starting with 2 weekly freighters in 1990 to 5 services by 1999, tapping into the theory that competitors want to locate close to one another.

7.7.4 Incentives

As with many other airports, DFW offers incentives to potential new carriers to begin serving the airport. However rather than offering reduced landing fees, ground rents, terminal rents or warehouse rents, the airport has a carrier support programme to entice airlines to the airport which focuses on "marketing cooperative dollars". This is aimed more at retention of new carriers and is deliberately suited to attracting airlines with a long term plan for serving the airport.
Under this scheme every dollar an airline spends on marketing the airport will match up to a pre-determined amount, typically $100,000 for a new cargo entrant, providing they commit to a minimum of two weekly services. The airport believes this incentive is more beneficial to airlines, particularly as it is a more sustainable approach helping the airline to grow its business rather than providing a short term gain in the form of a landing fee reduction. The airport's focus is on retention and stable growth:

"It is very easy for freighter operators to get money from us and we want it to be because I don't want a cargo airline to come here and not be successful, that happened to me twice with the same airline and I'm not going to let that happen to me again. I don't want you here unless you're going to be successful and are here for the long haul".

Section 6.2.7 of thesis describes how freighter operators felt incentives designed to establish new services once they had begun were of more value than short term landing fee reductions. China Cargo airlines concurred with this and described it as "a small factor but something we included in the cost analysis of using DFW". It was seen by the airline as as much of a philosophical demonstration that the airport was committed to serving freighter operators and helping them to be successful as an incentive in itself.

7.8 Airline Decision Factors and Process

For China Cargo Airlines, DFW Airport's business case presentation answered a number of questions about the viability of operating there and the focus on cargo of what they had perceived to be a passenger airport. Asked how much influence the presentation had in persuading the airline to operate to DFW, the US manager responded positively:

"The presentation was important as it opened our eyes to the huge demand in North Texas which we knew was there partially but not to the extent that it turned out to be once we had run the figures ourselves. It was also significant to see the positive
attitude of the airport towards cargo and the respect they paid to our airline which is always important but particularly so for a Chinese company. Certainly we were considering the airport much more after (the presentation)."

Figure 7.2 illustrates the main stages for China Cargo Airlines initiating its freighter service into DFW Airport and gives an indication of the timescale involved and the key events. What it shows is that there was a long process after DFW's visit to Shanghai before the service would commence. The downturn at the end of 2001 had already delayed plans by the airline for US expansion before DFW's visit and the airline didn't begin focusing on US expansion again until the Autumn of 2002.

The interview revealed that the first evaluation stage for the airline was to perform a cost and commercial benefit analysis of DFW in order to assess demand for the potential service and balance this with the likely costs of using DFW. The airline also performed the same analysis of Houston Intercontinental Airport. Atlanta Airport which it had earlier considered did not effectively serve the specific Texas market the airline wanted to serve.

The commercial benefit analysis in the main consisted of evaluating the same figures that the airport had used in its presentation, focusing on the level of trade between various markets and the propensity of various potential shippers based both in Texas and Asia to use a thrice-weekly service as proposed. This is where the airline had been particularly influenced by the airport's marketing when it came to conveying demand between the DFW Metroplex and China.

"They did a very good job of showing us the pre-existing demand for a direct service to China from the local business community and the airport was particularly suitable as it gave us such good access to the demand which was focused relatively close to the airport."

As with many markets the airline found that trade flows were heavily biased towards exports from China though with substantially less demand on the return. The airline therefore proposed a co-terminal (shared) service with Seattle and Chicago as an extension of current services with the aircraft routing Shanghai-Seattle-DFW-Chicago.
Chapter 7 - Case Study

May 2001  
**Airline considers medium-term plans to develop US services**

June 2001  
Airline researches airports in various regions of the USA

Airline studies the success of Asian carriers operating at airports outside major gateways

August 2001  
Airline makes enquiries about landing fees at airports in the Southern USA

DFW one of these airports and responds quickly by sending the requested information

October 2001  
Airport follows this up with calls with aim of developing meeting at airline HQ.

Meeting arranged in Shanghai for December.

December 2001  
Airport gives business case presentation at meeting in Shanghai

January 2002- November 2002  
Airport updates airline on developments and invites airline managers to visit DFW

Airline performs analysis on potential airports

December 2002  
Airline’s US manager makes visit to DFW for discussions and tour of facilities

February 2003  
Airport visits airline’s US HQ for further discussions & to respond to queries

March 2003  
Discussions between US office and HQ. Agreement to serve the airport when ‘conditions are right’

Airport assists airline with regulatory issues to allow a service to begin

July 2003  
Airport visits airline’s HQ to finalise terms. Terms of operation are agreed in principle

September 2003  
Airline visits airport and finalises the agreement to operate an initial 3x weekly service

Airline meets with support services at airport including handlers to formalise agreements

February 2004  
**Airline commences service**

Figure 7.2: Timeline for the development of freighter services at DFW by China Cargo Airlines

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-Seattle-Beijing-Shanghai, thus reducing the dependence on a single market to fill the aircraft outbound from the US, particularly in the infancy of the service.

Furthermore the airline assessed data detailing the loads carried by competing carriers between DFW and Asia to gain an indication of how the paper demand translated into freight on aircraft. These figures convinced the airline that there was a strong enough demand in both DFW and Houston and that they should look at commencing a service to one of the two airports, although the airline conceded that after meeting with DFW, this airport was the preferred option unless it proved to be considerably more expensive.

China Cargo Airlines therefore ran a detailed cost analysis of landing, parking and handling fees at DFW compared with Houston, as well as operational aspects such as flying costs. Fuel costs were not a particularly important factor as the aircraft would be flying only a relatively short distance on to Chicago, although the airline did concede that if the aircraft was flying back to China from Texas, then the fuel prices at the two airports would have been a significant consideration. Airport user charges were described by the airline as “a consideration obviously, but certainly not the most important consideration”. By industry standards landing fees at both airports are relatively low, although the airline was able to obtain a rate at Houston considerably lower than that offered at DFW, with the former charging $1.66 per 1,000 lbs of landing weight versus $2.91 at DFW. For an MD-11 aircraft this was estimated to equate to a saving of approximately $500-600 per rotation from operating to Houston.

However the problem from a cost perspective of operating to Houston was the increased distance the aircraft would have to travel coming in from Seattle and flying out to Chicago. Houston for example is 1,871 miles from Seattle, 214 miles further than DFW, whilst it is 926 miles from Chicago, 125 miles further than DFW. This equates to approximately 45 minutes of combined extra flying time by operating to Houston. Hence from the airline’s perspective:

“If you’ve got to fly to an airport that’s another 25 minutes away and to then fly back an extra 20 minutes, that’s a lot of extra cost which even outweighs a landing reduction”.

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The airline also contacted handling companies at both airports to discuss handling arrangements and charges for a potential service. The airline declined to comment on exactly what deals on handling they had been offered but described handling rates at both airports as "equally attractive". Hence from an overall cost perspective DFW Airport was the lower cost option although only by a small margin.

During this evaluation period the airline’s US regional manager visited DFW Airport in order to discuss the finer details of the costs and terms of operating to the airport as well as to meet with handling companies. By having the airline visit, the airport could more effectively market their physical assets such as cargo terminals and customs facilities and reiterate the benefits of the airport discussed at the meeting in Shanghai. The final decision to commence a 3 times weekly service was made by a team including the vice president of cargo and the operations director with input from the US office.

So what were the factors that finally led China Cargo Airlines to operate to DFW? The lower costs of operating to DFW and the lower aircraft utilization were factors but not overriding ones as described by the airline:

"Ultimately we’re aiming to run a flight at a profit but there are a number of factors other than costs which determine our profitability; in particular loads and yields".

Loads and yields (revenue per unit of cargo) were particularly important and in this regard the airport’s marketing was correctly pitched, focusing as it did on the high technology companies in the Metroplex who are strong importers of goods from China. When completing their own analysis of the market the airline became convinced that due to the high technology and telecommunications cluster there would be demand for a service from Shanghai, particularly as they saw that their competitors were carrying full loads on the vast majority of flights from Asia to DFW.

The other freighter operators at the airport were also influential in China Cargo’s decision, not necessarily because of the potential to cooperate, given that they were largely operating in a similar market to those carriers, but because they had seen them as examples of success at the airport. The passenger airlines operating wide body
service to Latin America were also important for the airline in this case as partners to transfer Asia to Latin America cargo to its final destination, and the ability to serve this market from the airport was particularly important.

As for the overall influence of the DFW marketing approach, China Cargo Airlines felt it had been influential, particularly as the airline had not begun the process considering DFW as a front running candidate for the service. They felt that the airport had succeeded in terms of convincing them of the market, and that they were prepared to give cargo equal status to passenger operations as well as by showing them the facilities they had to offer. Furthermore they felt that the airport would provide support to the airline once services commenced, something the airline placed a great deal of value in.

However whilst DFW’s marketing approach was a success and certainly effective for them, the airline commented that not all airports would be able to convince them by adopting the same approach:

"The airport's job is to convince us that they are right for us. If an airport is not right for us then no amount of marketing or incentives are going to make up for that because the result would be that we simply have to move somewhere else which is costly and unsettling for our customers. We saw early on that DFW was right for us and were therefore willing to listen more to what they had to offer, and yes, we did like what we heard".

When asked to summarise the three most important factors that led them to operate to DFW Airport, the first non-traditional gateway with direct services to China, the strong trade between the two regions and the requirement from forwarders and shippers for a direct service was considered the overriding decision factor. The absence of operating restrictions and capacity for expansion were seen as second most important, followed by the enthusiasm of the airport towards cargo and attracting the services of the carrier.
7.9 Key Findings

This chapter has produced a number of findings key to addressing the research objectives and propositions. The most significant findings from this chapter are summarised below:

- This case has demonstrated that the process of attracting non-integrated freighter operators can be a long term one (typically measured in years rather than months) which requires a lot of input from the airport.

- Meeting face to face is an important part of the process of airlines working with airports to establish freighter services and such meetings should be the goal for airports and their marketing.

- Airport marketing can be effective in terms of informing potential operators of the merits of the airport but the airport must have merits which the airline values and marketing is only an introduction to this.

- The key focus of marketing from an airlines perspective is to show that there is demand for the airline’s services. Tailoring this for the particular airline has shown in this case to be effective.

- Offering marketing support as an incentive as opposed to reduced charges proved effective supporting the findings of chapter 6.

- Industrial clusters are attractive to freighter operators and were the key for China Cargo Airlines, particularly as the airport showed the airline that this demand was un-serviced by existing operators.

- The presence of other freighter operators is a factor in influencing location decisions and was in the case of China Cargo Airlines, particularly as it allowed the airport to show the success of other airlines at the airport, reducing uncertainty.

- Airport charges were not seen as particularly important for China Cargo Airlines with more of a focus on a location which would provide higher yields for the airline. Where costs were important was with reducing flying time which was a significant factor in the choice of DFW.
• DFW Airport’s focus on shippers, particularly by naming the relevant players, was very influential on China Cargo Airlines, more so than the concentration of freight forwarders the airport had. This is particularly significant as other airports in both the survey and interviews played down the influence of shippers in favour of forwarders.

This case provided an insight into the process of freighter operator locations from both perspectives. Whilst the timescale of this process can vary greatly in each individual case, the stages highlighted in figure 7.2 are nonetheless representative of a typical process and cements the idea of relationships, trust and a proactive attitude being the keys to success.

DFW Airport effectively used knowledge of what airlines require from airports in order to attract China Cargo Airlines. Such knowledge and guidelines developed from this thesis can potentially assist other airports to do the same.
Chapter 8 - Discussion of Findings

8. Discussion of Findings

8.1 Introduction

This chapter forms a discussion of the findings from the empirical research conducted in the form of two international surveys, a series of interviews and a single case study. Chapters 5, 6 and 7 each produced findings which were analysed according to their specific objectives. This chapter is analysing the research findings from these chapters in line with previous knowledge gained from the literature review and theory of location – in particular the nine research propositions outlined in chapter 4, section 4.2.2.

The chapter is structured around eight major themes which have emerged from the research as summarised in table 8.1.

These eight themes have developed from the first seven chapters of this thesis, and have been common in both the literature chapter and the three findings chapters. Using the themes common to the key findings chapters of the thesis makes for a concise cross referencing of information from which to deduce findings.

The ‘discussion outcomes’ from the topics outlined in table 8.1 are summarised at the end of each section within this chapter in order to highlight the key factors influencing cargo airlines’ choice of airport that emanate from the discussion.
### Factors Impacting Choice of Airport

<table>
<thead>
<tr>
<th>Factors Impacting Choice of Airport</th>
<th>Specific Discussion Topics Within Each Theme</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.2 Process of Airport Selection</td>
<td>8.2.1 The stages in choosing an airport</td>
</tr>
</tbody>
</table>
| 8.3 Geographic Factors & the Influence of Local Demand | 8.3.1 Clusters as indicators of air freight demand  
|                                     | 8.3.2 Importance of location within a market  
|                                     | 8.3.3 The use of clusters as a location tool  
|                                     | 8.3.4 Impact of airport access time           |
| 8.4 Financial Considerations       | 8.4.1 Influence of airport costs on location  
|                                     | 8.4.2 Influence of flying costs               |
| 8.5 Existing Airport Operator Profile | 8.5.1 Impact of the location of competitors  
|                                     | 8.5.2 Influence of alliance partner presence  
|                                     | 8.5.3 Influence of integrator presence        
|                                     | 8.5.4 Influence of passenger services         
|                                     | 8.5.5 Reduction in uncertainty                |
| 8.6 Stakeholder Influences         | 8.6.1 Freight forwarder influence             
|                                     | 8.6.2 Shipper influence                       
|                                     | 8.6.3 Handling agent influence                |
| 8.7 Airport Characteristics        | 8.7.1 Airport cargo focus and reputation      
|                                     | 8.7.2 Congestion and speed through the airport |
|                                     | 8.7.3 Airport infrastructure                 |
|                                     | 8.7.4 Freighter prospects of different types of airport |
| 8.8 The impact of legislation on location | 8.8.1 Environmental restrictions          
|                                     | 8.8.2 Policies and politics                  
|                                     | 8.8.3 Air Service Agreements                 |
| 8.9 Airport Air Services Marketing | 8.9.1 Effectiveness of airport marketing     
|                                     | 8.9.2 Impact of incentives                   
|                                     | 8.9.3 Relevance of airport marketing         |

Table 8.1: Major themes emanating from the research, forming the structure of this chapter.

#### 8.2 The Process of Airport Selection

Proposition 1 formed in chapter 4 concerned the suggestion generated from the literature review that the location decisions of freighter operators is typically a three-stage process, whereby airlines first highlight a region to serve based on demand for freighter services, before evaluating the operating restrictions at airports in that region, and finally assessing the individual attributes of the remaining, feasible airport locations. The empirical findings with regard to the process of airport selection have been relatively uniform as discussed below.
8.2.1 The stages in choosing an airport:

The empirical research for this thesis has revealed that the identification of the market to serve is typically the first stage in locating a cargo service with the demand from the market acting as a trigger for the whole process. This was found to be the case both with regards to the airlines surveyed in chapter 6 (see section 6.2.8) and with China Cargo Airlines in their choice of DFW Airport.

Identifying how the rest of the process unfolds is less straightforward as each instance is unique, although a simplified framework has been identified. The second stage identified through this research has been the identification of the vetoes i.e. the obstacles that prevent a carrier operating to a particular airport, such as issues of market access (from regulation) and local politics. Descriptions of this stage suggested that this was not necessarily deliberate and instead performed in the subconscious alongside the choice of region. For example many operators would be aware that gaining access to London Heathrow would not be possible due to capacity and/or bilateral restrictions without having to consciously eliminate these airports from their evaluation.

The third stage is concerned with the specific factors that determine the choice of airport, described by one airline as a cost and commercial benefit analysis; whereby costs associated with operating to the viable airports are evaluated, along with the other factors that contribute to the commercial viability of that airport, for example the speed at which cargo can be moved, the potential to cooperate with other carriers or the potential to avail of agglomeration economies as a result of a concentration of related companies on a particular airport site.

When asked in the survey whether they agreed with this as a framework for their location decisions, 89% of airlines agreed with the three-stage process brought forward from the literature and there was general agreement among interviewed carriers too. The main modification suggested was that in the third stage there was typically a separation of market factors such as costs, competitors and customers, from technical factors such as choosing fuel or handling service suppliers or
establishing crewing requirements, with the latter not necessary until an airport had been chosen.

One important research finding is that the timescale for these location decisions can be relatively short i.e. a matter of months, but more typically is much longer and measured in years; as demonstrated with the case of China Cargo Airlines at Dallas Fort Worth Airport. A feeling of urgency came across from airports in the interviews and survey, yet the finding is that airports must think long term rather than looking for a short term gain. As the case of DFW working with airlines for a long, possibly 3-5 year period can pay dividends in the long term and increase success in the freighter market.

8.2.2 Discussion outcomes

- **Proposition 1** that the region is the first decision, followed by an assessment of vetoes and then an evaluation of airport attributes, was endorsed by freighter operators and airports alike, although stage three was seen as having two parts: an assessment of market factors, and an assessment of technical factors (section 8.2.1).

- Each location decision varies in some way and the generic three stage process can be overridden by behavioural factors (section 8.2.1).

- Choosing an airport and being in a position to confirm a service can be a long term process for a freighter operator, typically measured in years rather than months. Airports must therefore not expect to be instantly successful courting particular carriers (section 8.2.1).

8.3 Geographic Factors & the Influence of Local Demand

**Proposition 2** states that freighter operators choose regions to operate to based on economic activity and are particularly attracted to regions with a cluster of companies manufacturing or receiving goods suitable for carriage by air. This link between the
locations of freighter operator locations and the economic fortunes of regions has been a consistent theme of this thesis from the literature chapter, through the theory and onto the empirical findings.

8.3.1 Clusters as indicators of air freight demand

Clusters are a primary indicator of air freight demand as they usually account for a major share of the economy within a geographic area. The attraction of freighter operators to clusters of industry is at one with the phenomenon that economic activity in general tends to congregate in cities or large conurbations where the demand for such goods and services is greatest, as identified in section 3.5 of the theory chapter. It is urbanisation economies that result from the clustering of economic activity in a geographic area and the evidence described in this section shows that freighter operators take advantage of these same economies when choosing airports close to demand.

These clusters create a level of demand for the movement of associated goods that draw freighter operators to an airport serving this cluster, hence Oakland, San Francisco International and San Jose, three airports serving the Silicon Valley cluster, all have significant air cargo activity. The case study of DFW Airport demonstrates that strong industrial links between local cluster firms and other world regions is a strong catalyst for the development of non-integrated freighter services. The fact that 7 of the 10 largest trading partners with the Dallas-Fort Worth Metroplex area are Asian countries, from where the majority of freighter growth has come, is a demonstration of the extreme importance of an airport being located in proximity to a demand-generating market, which China Cargo Airlines confirmed in giving reasons for choosing DFW in section 7.8.

Airports that are located close to clusters of air freight friendly industry such as technology production, pharmaceuticals, automobile assembly or fashion clothing production - as described by Bevan (ASM, 2000) in section 2.2.2 and in table 2.2, have a vastly increased chance of attracting non-integrated freighter operators than airports located away from such industries. This was clearly demonstrated in the case
of Dallas-Fort Worth Airport where it was found that the technology cluster in the DFW metroplex was the factor that underpinned China Cargo Airlines' choice of the airport, without which they would probably not have located at DFW.

The findings in this regard uphold proposition 2 that freighter operators look to regions with a cluster of manufacturing of goods suitable for carriage by air.

8.3.2 Importance of location within a market

Exactly how central to the epicentre of this demand does an airport have to be? What emerged from cross tabulations of the survey data was that the importance of the locality of the airport to the epicentre of demand diminished as the length of the route operated increased. This was because ground transportation from the airport to the final destination is a smaller proportion of the total journey time the longer the flown portion of the journey is.

In practice this means that long haul carriers do not need to locate at airports as close to clusters of demand as short haul airlines. In the UK for example no Asian (or any long haul freighter operator) serves more than two airports on a scheduled basis, yet the number of cities that have trade links with Asia through the import and export of high technology goods and textiles is numerous. From locating at London these carriers can reach the rest of the UK by truck within 24 hours – a much more acceptable time than if the goods were coming from Continental Europe given that it would form a much greater proportion of the total transit time. Short haul carriers are therefore more reliant on locating at airports that are closest to the actual clusters of demand and this is borne out by the presence of such carriers at UK regional airports.

8.3.3 The use of clusters as a location tool

Whilst clusters are a strong indicator of air freight demand, such a cluster does not necessarily mean that a new airline entering the market can take advantage of it as other operators may already be matching supply with demand. Therefore whilst the
findings concur with proposition 2, this is only the case if the demand is un-serviced (i.e. demand that is not currently being met with supply), and this requires a knowledge of the market and the airlines operating in that market.

One finding to come from the case study (see section 7.8) was that although trade links may be strong between two regions e.g. DFW and Hong Kong, Asian carriers may not be fully aware of the extent of these links and therefore focusing on this for specific carriers, and educating them as to the strong market opportunities, perhaps in conjunction with major shippers, would offer the airport a much stronger chance of success in attracting new freighter services. This is particularly the case as freighter operators have shown they will not operate to an airport that will not provide them with consistently high loads and yields.

What airports could do more with regards to their marketing is to link their location with that of clusters if they are able to. Some airports made reference to this (see section 6.3.2) and also raised the issue of trucking being a valid indicator of potential demand on a particular route if goods manufactured in their region are being trucked to airports in other region to be flown. The practicalities of gaining reliable data on trucking flows are difficult for airports without good financing to commission a study though and therefore whilst airports may wish to use demand as a key marketing tool, some are finding that their hands are tied with regard to accessing the information they need.

8.3.4 Impact of airport access time

Whilst an airport located close to clusters of demand is important for freighter operators, of all the factors considered important in an airport, ground access was ranked highly by the freighter operators surveyed (see section 5.2.1). The airline interviews revealed that efficient and expedited access to the airport for trucks could override the influence of exactly where in a region an airport is located, with the emphasis more on overall speed between airport and destination than geographic proximity. As one of the interviewees argued, speed is the main product of air freight
as non-urgent goods can be shipped at greatly reduced cost by other modes (see section 6.2.1.2).

8.3.5 Discussion outcomes

- Demand for the movement of goods is a catalyst for freighter operators initiating service to a particular region as they seek to take advantage of urbanisation economies (section 8.3.1).
- Clusters, as an exaggerated pocket of demand, make their region particularly attractive to freighter operators wanting to link them with their trading partners, as proposed in chapter 3 (section 8.3.1).
- Only a certain type of cluster, typically those involved in the production of physical goods, is attractive to freighter operators (section 8.3.1).
- The shorter the distance travelled by air, the more important it is for freighter operators to operate to an airport as close to the epicentre of demand or that offers the shortest travelling time (section 8.3.2).
- In order to attract new freighter operators the demand must be un-serviced i.e. demand must outstrip current supply (section 8.3.3).
- Effectively conveying the demand to prospective carriers is of utmost importance for airports, although gaining specific statistics on the nature of the demand is problematic (section 8.3.3).
- The speed of access between the airport and market is of utmost importance, more so than the physical distance between the two, placing a great deal of importance on effective transportation links (section 8.3.4).

8.4 Financial Considerations

The theory of location, particularly the work of Weber (1929) and Lösch (1954) is involved very much with the link between location choice and the costs of serving each location, finding that firms choose least cost or maximum profit locations (see chapter 3). The empirical stage of this research has sought to explore the extent of the
influence of various costs on the location of freighter operators, particularly airport user charges, fuel and flying costs, as well as handling charges.

Proposition 3 states that costs are the most significant factor driving the location of non-integrated freighter operators and the validity of this statement is explored in this section.

8.4.1 Influence of airport costs on location

Cost minimisation was found to be a key focus for freighter operators in locating their services and was viewed as the second most important influence on freighter operators' location decisions by both the airlines themselves (see table 5.1) and to an even greater extent by the airports in the survey (see table 5.7). The fact that airlines use a cost analysis (see sections 6.2.2.1 and 7.8) as the basis for a decision together with an evaluation of the commercial benefits, confirms the importance of this factor.

The existing literature (section 2.3.2) focuses mainly on airport user charges when it comes to the cost influence on cargo airline location decisions, although the literature sources were contradictory with some sources suggesting they were of utmost influence and others finding them to be a relatively small part of an airline's costs. What the empirical findings have revealed is that airport user charges alone do not have a great deal of influence (see sections 6.2.5 and 7.8). Lowering airport charges are one of the few factors over which most airport authorities have control, but the impact of such an action has been shown to be minimal and it was made clear that airlines would not be influenced by cheap landing fees if the airport was not right for them, as demonstrated by China Cargo Airlines choosing DFW Airport when Houston had lower charges (see section 7.8).

Airports user charges are typically of much less importance to the total costs of non-integrated carriers than many of the other elements. From the survey airport user charges were found to account for an average of 7.8% of total costs of a service (see section 5.2.2.2), with handling at between 10 and 12% (see section 6.2.5.1) and fuel accounting for anything up to 28% of operating costs (see section 2.3.2).
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Fuel prices are the most significant contributor to airport-related costs, but are typically more stable between locations in a single region. Handling charges can vary between locations but their individual nature can make it difficult to compare rates. Airport user charges on the other hand are readily accessible, variable between locations and also open to discount from airports and this is perhaps why they are viewed as having a certain level of locational influence.

As well as costs, the other contributor to profit is revenue and a low cost airport is of little value to an airline if they cannot obtain high loads and yields and this fact puts the importance of airport costs in perspective. The most effective location for a freighter operator will ultimately be that which gives maximum profit (see section 7.8), regardless of the balance between costs and income and often an airline will have to pay higher costs in order to access a higher yielding airport. This follows Losch’s (1954) theory (section 3.2) that maximising profit is of greater importance than lowering costs as advocated by Weber (1929). From the airport perspective therefore it is just as important to convince an airline of the load and yield potential as it is to financially incentivise them.

When evaluating the true impact of airport-related costs on the location decisions of freighter operators it has to be considered that carriers use cost as a key comparison tool between locations and whilst overall profit is more important than lower costs, the emphasis placed on total costs to compare locations is a demonstration that costs in themselves do have some locational influence, although when taken as a whole rather than any individual element.

With regards to proposition 3, costs are not therefore the most significant factor driving the location decisions of freighter operators - they merely contribute to profit along with revenue which can be increased by operating to high yielding cities. It is therefore profit and not costs that is the most significant factor driving the location decisions of non-integrated freighter operators.
8.4.2 Influence of flying costs

The difference in the costs of flying to one location over another in terms of flying time was consistently identified by the freighter operators participating in the research as a significant contributor to the overall costing of a route (see sections 5.2.2.2, 6.2.5.2 and 7.8), and therefore one of the key reference points for reducing costs: An airport serving a region that allowed for the shortest flying time from the origin can typically offer a cost advantage over other locations in terms of fuel saving and aircraft and crew operating costs, that could outweigh any difference in landing fees.

If freighter operators operated multiple routes into an airport it is not suggested that they would operate different routes into different airports, and in such a case this particular cost element would likely not feature at all in the decision. However where a region is linked as a stand alone destination, the research suggests that this is a particularly important consideration, particularly as it can cost many thousands of dollars to operate an aircraft for just one hour (see section 6.2.6.1).

The interviews and case study revealed a number of instances of freighter operators being influenced in their location by the geographic proximity of the destination to the origin. In chapter 7 for example, China Cargo Airlines found DFW Airport was more expensive in terms of airport costs but allowed for a shorter flying time and ultimately lower total costs than Houston. Similarly MK Airlines resisted otherwise suitable locations in the North and Midlands of the UK due to the extra flying costs associated in using them (see section 6.2.5.2), demonstrating that flying costs are more of a consideration than airport costs.

8.4.3 Discussion outcomes

- Profit is a primary motivator of location and following an identification of a region to serve is the most important factor affecting the specific choice of airport (section 8.4.1).
• Controlling costs, as a major contributor to profit maximisation, is a priority for freighter operators and the lowest cost location overall has a vastly increased chance of being chosen, but not if it is at the expense of a location with high demand (section 8.4.1).

• Airport user charges alone are not significant enough to strongly influence location, yet the flexibility of the airport to alter them and the public nature of the published rates, makes them symbolically important for the airports to keep low (section 8.4.1).

• The costs of operating the aircraft form a much greater proportion of route costs than airport-related charges and where possible (depending on the nature of an airline's intended presence in a region) airports are chosen that minimise flying time between origin and destination (section 8.4.2).

• The whole is greater than the sum of the parts in that individual cost elements alone do not impact significantly the location of non-integrated freighter operators, whereas all costs added together provide a much more solid basis to make a location decision (sections 8.4.1 and 8.4.2).

8.5 Existing Airport Operator Profile

There are a number of facets to the potential locational influence of other airlines at an airport. There was evidence in the literature and theory chapters that competing airlines, partner airlines passenger airlines and integrators have some impact on the locations of non-integrated freighter operators for a variety of reasons ranging from agglomeration economies, protection of market share, access to higher loads to the reduction in uncertainty that the presence of other carriers offers. This evidence is reflected in propositions 4, 5 and 6.

8.5.1 Impact of the location of competitors

Proposition 4 states that freighter operators specifically seek to locate alongside competitors when operating into the same market. From the Hotelling (1929) model
(described in section 3.3) it can be surmised that locations central to the market are preferred where there is more than one carrier operating so as to prevent competitors from capturing a disproportionately large share of the market.

Manifestations of Hotelling's theory have been observed during this research. For example, Dragonair disclosed they were 'influenced by where competitor Cathay Pacific operated in Europe (see section 6.2.3.2). A further, slightly different example from the literature was the situation at Calgary in 2004 (see section 2.4.6), whereby Cargojet began linking Calgary and Vancouver directly prompting Air Canada to introduce freighters on the route to protect their market share. The case study in this thesis is another prime example of how an airport can benefit from existing freighter services as it was China Cargo Airlines' evaluation of competitor locations that first prompted it to look at DFW which demonstrates the momentum that can build once a critical mass of freighter operators serve an airport.

These examples however are in stark contrast to the 60% of freighter operators in the survey that said the location of competitors had no influence on their choice of airport. The interviews and case study found a number of reasons why the locations of competitors may not necessarily be of influence in all situations.

As shown in section 6.2.3.2, competitor locations were only an influence if the competitor was at the more desirable airport and that freighter operators would not follow their competitor if they operated from a less central airport. Where major airports are concerned though there was evidence of freighter operators imitating each other in terms of their locations as per proposition 4. This is for the primary reason that the longer an airline operates in a major market uncontested the harder it will be for a new entrant to recover market share later on.

8.5.2 Influence of alliance partner presence

Proposition 5 states that airlines specifically look to locate with their alliance partners. As section 5.2.4.1 shows, 54% of the airlines surveyed (equating to 21 actual carriers) were involved in a partnership with another cargo airline and of these two thirds
claimed to have been influenced by the location of their partner, particularly to offer a seamless connecting service but also to offer joint marketing. Such marketing and service linkages by firms in a confined geographical area are said in section 3.6 to lead to agglomeration economies resulting in lower costs or increased revenue. The findings from this thesis reveal that airlines are looking to avail themselves of these economies by locating with partner airlines:

8.5.3 Influence of an integrator presence

One of the most significant findings on the theme of other freighter operators is the impact that integrators can have on the overall cargo fortunes of secondary and tertiary airports. There is evidence from the interviews, particularly with reference to the experiences of Nottingham East Midlands Airport (see section 6.2.3.2), that integrators can transform unfeasible locations into airports that non-integrated carriers would want to operate.

Where integrators establish hubs they usually develop the airport, building high-tech cargo terminals which remain largely unused during the day, something non-integrated carriers can take advantage of. When an integrator establishes a hub operation at an airport, the evidence suggests that it acts as a surrogate for all the activity at a major gateway, providing all required infrastructure, a network of flights to offer connections and an all-in-one handling agent and freight forwarder. The interviews revealed a number of examples of how an integrator presence at a secondary airport had overcome the limitations usually associated with such locations. For example carriers such as Kalitta have global partnerships with integrators and DHL’s presence at Nottingham East Midlands Airport was one of the main factors that led Kalitta to operate there and not to a major gateway airport, as revealed in section 6.2.3.2.

The two main elements of an integrator hub that are attractive to non-integrated carriers is the feed that a network of integrated freighter services can provide, and also the opportunity to receive preferential rates from integrators, as well as the state of the art facilities they can offer.
Integrators can also act as catalysts for aerotrololi (detailed in section 3.7), as with the example of Ontario, California where the FedEx hub has directly attracted a great deal of industry to develop around the airport which in turn can create demand for non-integrated carriers.

8.5.4 Influence of passenger services

As with the impact of existing freighter operations, there were found to be a number of different impacts on freighter operators from the presence of passenger airlines at an airport. Proposition 6 states that combination carriers will choose to locate both their passenger and freighter services at the same airport in a given market, and this was found to be one of the most pronounced impacts of having a concentration of passenger services at an airport.

The literature, for example ASM (2000), suggested that an existing passenger hub providing access to belly capacity, was an ingredient for a successful cargo airport. The issue of collocating freighter and passenger services provided differing views between the survey and the interviews and case study though. In the survey (section 5.2.4.3), just over half of the airlines that operated both passenger and freighter services claimed not to be influenced by the location of their airline's passenger services when locating a freighter service in the same region. However the combination carriers interviewed strongly felt that the location of their passenger services had an impact on where their freighters were located. The combination carriers did not want to fragment their freight by operating passenger and cargo operations into different airports. Weber (1929) identified the main economies of agglomeration as cost savings through economies of scale (see section 3.4). These internal economies of scale gained through the avoidance of duplicating overheads and staff costs, were found to be very important to freighter operators with regards to co-locating passenger and freighter aircraft, as was the flexibility to ship cargo on either the passenger or freighter service. The case highlighted in section 7.3 of Lufhtansa at Dallas Fort Worth Airport is an example of an airport benefiting from its passenger services, when the airline chose DFW for freighter operations having operated passenger flights as well.
Airports too felt that having major combination carriers operating passenger services to their airport was a major advantage to them when it came to attracting their freighter services and as the interviews revealed in section 6.3.3.1, a number of them had had experiences of when this paid dividends.

In terms of the influence of passenger airlines—it can be concluded from the research that freighter operators do not base their locations on those of passenger airlines, except in cases where an airline has their own passenger and cargo operations, in which it is desirable for these carriers to collocate the two services if involved in the same market, as per proposition 6.

8.5.5 Reduction in uncertainty

Regardless of whether freighter operators have a partnership with other carriers or are influenced by their partners, a cluster of freighter operators at one airport offers another, less tangible advantage which both the theory and empirical research indicate is of a great deal of importance. The reduction of uncertainty from following other carriers into a market is something that many carriers felt was a key advantage of a major airport as it shows that carriers have made the airport work for them.

As the theory identified, trading in international markets introduces a great deal of uncertainty and risk due to cultural differences and local regulatory requirements. One of the advantages that Porter (1998) identifies with clusters is that they make it easier for firms to measure and compare performance. In this case airlines can measure the performance of competitors before committing to a location.

If a number of competing firms are clustered in a particular location and are surviving and thriving, other operators may observe this and conclude that conditions must therefore be satisfactory for them, as opposed to an untried location which carries an element of risk. By observing other freighter operators at an airport much of the uncertainty disappears, particularly if there are carriers operating between the same markets as the potential operator, in which case they can gain a direct indication of likely loads. This is a manifestation of why the word "momentum" was used so
frequently during the airport interviews as established air freight hubs such as Amsterdam and Frankfurt are viewed by freighter operators as 'safe bets' making it difficult for airport with little or no freighter traffic to 'break the cycle'.

8.5.6 Discussion outcomes

- A competitor operating into the main central gateway airport in a region makes it much less likely that a new entrant will choose to operate anywhere but that gateway airport if permitted (section 8.5.1).
- One airline’s decision to serve a particular airport in a key market will accelerate competitors plans (if they have plans) to serve that same market so as not to loose market share (section 8.5.1).
- The presence of partner airlines, particularly those with complementary route networks is attractive to a freighter operator as it allows through services to be marketed, thus providing both partners with the opportunity of gaining extra loads on their respective services (section 8.5.2).
- For secondary and tertiary airports the presence of an integrated carrier is the key to attracting non-integrated freighter operators as an integrator hub acts as a surrogate for all the typical advantages of a major gateway airport i.e. connections, facilities, freight forwarder and handling agent (section 8.5.3).
- The increasing popularity of global partnerships between integrated and non-integrated carriers can influence locations in favour of the hubs of an airline’s integrator partner (section 8.5.3).
- Over the long term an airport with an integrator presence can act as a catalyst for economic development in the surrounding area thus making it a more attractive environment for non-integrated carriers over a period of time (section 8.5.3).
- Combination carriers will seek to locate their freighter services at the same airport as their passenger services (if present) in a given region in order to avail of economies of scale and maintain flexibility in the carriage of cargo (section 8.5.4).
- This reduction in uncertainty from the presence of other carriers is important to freighter operators in their location decisions given the investment required to serve a new airport. The presence of other carriers provides an indication to a new
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-- entrant of potential loads by analysing the performance of competitors and can allay fears over the operating environment at the airport (section 8.5.5).

8.6 Stakeholder Influences

Proposition 7 states that freighter operators will locate where there is a concentration of freight forwarders and this section discusses the extent to which freighter operators are influenced by industry stakeholders in general. Whilst the empirical evidence upholds this proposition, the discussion here centres on the extent of this influence, and also that of shippers and handling agents, which have emerged from the empirical findings as other influential stakeholders.

8.6.1 Freight forwarder influence

Freight forwarders have been described in the literature as “controlling” non-integrated air freight (see section 2.4.4) and they do undoubtedly have a locational influence on non-integrated freighter operators. For example 73% of freighter operators surveyed in section 5.2.3 felt that having a concentration of freight forwarders at an airport was either important or extremely important to their location decision. But how far does their influence extend?

For many carriers freight forwarders were the primary influence beyond the actual region of the airport, but only in certain situations. These situations are typically where one airport in the region has a superior freight forwarder representation, and in this case that airport would likely be chosen, even if their charges were higher, as such a location would undoubtedly provide the airline with higher loads and higher yields and ultimately a more solid foundation from which to operate. Where a freighter operator is deciding between two airports with similar forwarder profiles though, as in the case of China Cargo Airlines deciding between DFW Airport and Houston (see section 7.8), then the influence of the forwarder is severely minimised.
Ultimately the freighter operator seeks a location that will yield the greatest profit and for most carriers the key to unlocking the business to gain this profit is the freight forwarder. It was found that long haul carriers were most sensitive to airports with forwarder bases (see section 5.2.3) as a result of a necessity to maximise business in foreign territories, although on the whole, the majority of carriers rely on forwarders for their main source of business.

The influence of the forwarder has become even more profound as freighter operators have begun to develop partnerships with major forwarders which have effectively tied them or at least severely influenced them into serving specific, typically major airports, emphasising further the need for other airports to work to attract the major forwarders, so as not to alienate themselves with freighter operators allied to forwarders not present at the airport.

For freighter operators it is important to be in a position to compete effectively for the forwarder’s business which can be most effectively achieved by locating at an airport with a strong forwarder presence where they typically consolidate shipments. This demonstrates in practical terms the impact of localisation economies (section 3.6) which draw airlines in to airports hoping to take advantage of these and economies of information as businesses can communicate more effectively with one another if they are located close by. However the research underscores that freight forwarders do not necessarily have to be located on the airport site so long as they are close enough to be considered part of an airport cluster and provide, and benefit from, localisation economies. For the airports, particularly the smaller ones, having forwarders endorse their airport by locating there is very important, regardless of how they operate with regards to shipping freight (see section 6.3.3.3).

As stated by Wheeler et al. (1998) in section 3.6, to gain a competitive edge firms must have a greater sensitivity to the locations of other firms providing support activities and this is something that freighter operators are following. The evidence is that freight forwarders are influential, as much by their absence at a particular airport, as by their presence at others and where there is a significant difference in forwarder presence between potential locations, those with the greater presence are significantly more likely to be chosen.
8.6.2 Shipper influence

The shipper, i.e. the company sending the freight, does not have a direct influence on the choice of airport of a freighter operator, and this was never contended except where they are chartering a whole aircraft. However a strong theme emanating from the research is the indirect influence that shippers have on cargo airline locations; particularly as a key indicator of demand and this is as a consequence of the influence clusters of industry have on freighter operator locations.

Chapter 7 revealed the extent to which the presence of shippers can influence the locations of freighter operators if used effectively as a marketing tool by the airport. DFW Airport revealed that shippers are an important marketing tool for them and see a significant advantage in being able to say specific shippers were demanding more service to particular regions when in discussions with airlines. The fact that China Cargo Airlines was especially enthused by this demonstrates the impact shippers can have on location decisions if first of all they exist in the vicinity of an airport and also if the airports exploit their presence in their marketing. Shippers were also mentioned as influential in section 6.2.3.3, although airlines did not universally acknowledge the influence of shippers.

The importance of engaging with shippers and promoting them to airlines is something that was universally understood by the airports interviewed either (see section 6.3.3.3) and the majority did not maintain a relationship with the major shippers in their area. What the DFW case shows though is that by liaising with shippers and gaining an understanding of any issues they face, such as a difficulty in getting shipments to reach a certain location as quickly as desired, the airport can then use this information to give freighter operators what has been shown to be one of the most important locational factors – an indication of demand for a service.

8.6.3 Handling agent influence

The impact of the handling arrangements at airports on a freighter operator’s decision to operate is not a factor greatly considered in the literature reviewed in chapter 2.
This factor was however found to be somewhat important, albeit fairly low down the list of factors for freighter operators to consider in terms of determining location.

Given the importance of handling at an airport to the day to day operation of a service this is considered before a freighter operator decides to serve a particular location with the main points of reference being competition for handling services (which typically leads to lower prices) and the presence of partner companies.

The interviews revealed that handling charges can vary, sometimes greatly, between airport locations and that overly high handling charges acted as a deterrent to potential airlines, given that, as the next section explains, handling charges can account for anything up to 12% of the total costs of a rotation. Section 6.2.3.4 identified how monopoly handling suppliers often equalled higher handling rates and MK Airlines stated they were particularly wary of airports with monopoly handling suppliers for this very reason. Therefore whilst low handling charges may not necessarily attract freighter operators to an airport over and above many of the other factors discussed, high handling charges would have more of an effect by deterring airlines from operating to a particular airport.

Given that handling is typically removed from the control of airports, it is something that is often ignored by airport authorities as a consideration when marketing to freighter operators. Airports can however take steps to control the influence of handling in their favour. As section 2.3.2 of the literature chapter identified, Ostend Airport has taken steps to attract competition in handling in an attempt to drive down handling rates and attract new carriers. This is an important step for airports with monopoly suppliers as lowering the costs of their operation was found to be an important motivation for freighter operators. This strategy has had success for Ostend as MK Airlines located there partly due to the willingness of the airport to allow them to self-handle (see section 6.2.3.4).

A further locational influence of handling agents is the magnetic effect of partner companies offering handling services at an airport. As section 8.4.3 explains, an integrator presence can have an influence on non-integrated freighter operators' locations and one of the primary reasons for this is the handling they can offer, often
at low prices given the under utilization of hub facilities during the day. Nottingham East Midlands Airport is a prime example of how handling provided by integrator DHL can help to attract freighter operators to an airport and by jointly marketing at trade shows the airport has had some success where it may not have otherwise (see section 6.3.7.1).

8.6.4 Discussion outcomes

- Freight forwarders are a significant external influence on the locations of non-integrated freighter operators and airports with concentrations of forwarders are important for many airlines as they are the key to unlocking higher loads on a route (section 8.6.1).
- Airports without a strong forwarder presence will find it difficult to attract non-integrated freighter operators, particularly if located in a region with other airports which have forwarders (section 8.6.1).
- Preferred partnerships between major forwarders and airlines make it increasingly important that airports have the major forwarders at their airport as loyalty to specific forwarders can influence the locations of airlines (section 8.6.1).
- The presence of companies that typically ship goods by air do not directly influence freighter operators to operate from a particular airport, but do provide a good indication of demand in a region (section 8.6.2).
- Airports can use shippers to market their airport to airlines if they can liaise with these companies, understand their requirements and focus this information on freighter operators that can serve their needs (section 8.6.2).
- The more handling agents at an airport the lower the prices are likely to be due to competitive effects. Therefore locations with more handlers are desirable to freighter operators and airports should encourage competition with handling because of this. Marketing in tandem with handling agents can also be a positive step (section 8.6.3).
- Whilst partnerships between airlines and handling companies leading to a decision to operate to a partner location are uncommon, this is much more likely to be of
influence if the partner is an integrated carrier who can offer services at lower costs due to low daytime utilization of facilities (section 8.6.3).

8.7 Airport Characteristics

It was identified in chapter 2 through the work of Adler and Berechman (2001) that airport quality is a factor in airport choice. This thesis has found that the reputation of the airport, congestion (impacting the speed of passage through the airport), the infrastructure availability and the scope of the airport are all characteristics that impact on the location of non-integrated freighter operators, which ultimately upholds proposition 8 that non-integrated cargo airlines prefer major gateway airports.

8.7.1 Airport cargo focus and reputation

Different airports place a diverse range of emphasis on the development of freighter services. For example whilst some have teams of personnel dedicated to cargo and its development at the airport, others ignore this sector completely or attach minimal importance to its development. The question is exactly how much of a role does the airport’s reputation for being “freighter friendly” or otherwise, play in determining the location of non-integrated freighter operators?

What was found is that freighter operators are very receptive to a positive stance towards cargo by the airport as section 5.2.2 in particular reveals. 79% of airlines in the survey felt that it was either important or very important for an airport they were using to have a good reputation as a freighter airport. The main reason for this importance appears to be the long history of discrimination by airports in favour of passenger services. This is demonstrated by over half of the airports surveyed who admitted that their passenger services are always or often favoured compared with freighters (see section 5.3.4). Given the nature of the sample for this survey i.e. airports with a desire to attract freighter operators, the true percentage of all airport who favour passenger services can be considered much higher.
Like any business, being able to make long term plans is a priority for freighter operators and therefore one facet of their location thinking must be to reduce uncertainty in the future. This means having the knowledge that, if required, the airline can have a long term future at an airport and this was a particular concern raised in the airline interviews (see section 6.2.4.2). Freighter operators need to establish a market presence and gain confidence from their customers and hence they need to have that same confidence in the airports that they operate to in order for long term plans to be made and to ensure efficient operations.

Referring back to the question of exactly how much of a role the airport's freighter friendly reputation plays in a location decision, it would appear to wholly depend on the types of airports the freighter operator is considering. If the consideration is between two or more airports with similar characteristics, then the benefit of a good working relationship with the airport and a feeling of long term security would likely play an important role in the decision process as was highlighted in the case study whereby China Cargo Airlines placed a great deal of importance on the positive attitude of DFW Airport when it was also considering Houston and Atlanta (as shown in section 7.8). If on the other hand one airport was significantly better equipped for freighter operations i.e. having the infrastructure and support services, then the airport's freighter stance would not override the likely gains in operating revenue from this location; so long as they were permitted to operate there.

8.7.2 Congestion and speed through the airport

Aeronautical congestion is a negative attribute of an airport in the eyes of potential operators. At the point where users of an airport are inconvenienced by delays or extended block times for departing and arriving aircraft due to congestion then agglomeration diseconomies are experienced and an agglomeration becomes incapable of maintaining its efficiency.

Whilst there are clear advantages from operating from major airports, as found in section 6.2.3 in particular, locations such as London Heathrow and Los Angeles are beginning to create severe diseconomies for airlines due to their high levels of
congestion which is slowing considerably the movement of freight (see section 2.3.1). For freighter operators it is a trade-off between the advantages of a major hub and these diseconomies, and it is a question of what level of diseconomies leaves operators looking for an alternative secondary location.

Another consideration, not necessarily linked with aeronautical congestion is the time it takes for goods to clear the transit sheds and begin their onward journey. One of the methods for measuring airport efficiency for cargo airlines is the time it takes from the aircraft arriving to the freight leaving the airport again on a road haulage vehicle (see section 6.2.4.1) and this is important as delays here negate any advantage an airline may have gained from locating close to demand, or the customer may have gained from using air freight in the first place, as opposed to other, slower methods.

When asked in the survey in section 5.2.2, 64% of freighter operators indicated that the typical aeronautical delay at an airport was an important consideration for them, a great enough proportion to suggest that congestion does impact location. However what the interviews reveal is that the impact of congestion and overall delays on a carrier is something that depends greatly on the nature and priorities of the freighter operator in question. For instance it depends on how much importance each carrier places on the advantages of operating in close proximity to other carriers and support services versus the need to minimize the time spent on the ground.

The airline interviews (section 6.2.4.1) found that airlines with three specific characteristics were least likely to be deterred by congestion. Firstly, long haul carriers were less sensitive to congestion for the reasons described in section 8.3.2, whereby the ground access element forms a much smaller proportion of the overall journey and are therefore less sensitive to time delays. Based on the assumption that the congested airport is a major passenger gateway, combination carriers are another typical exemption to consideration of congestion in favour of co-locating their passenger and freighter services at one location. The third type of carrier to find congestion at a major airport less influential on their location was those who rely on feed from connecting traffic at major hubs due to an alliance or similar partnership with another airline. These carriers will be more inclined to tolerate delays in favour of the benefits major airports typically offer.
It is the short haul carriers and the smaller independent airlines that perhaps don't work as closely with other carriers or have partnerships with freight forwarders, such as interviewee MK Airlines that are most sensitive to congestion and delays as for these carriers there is little to outweigh the diseconomies of congestion.

8.7.3 Airport Infrastructure

In the context of this research there are two foci when it comes to discussing the significance of airport infrastructure to freighter operators. Firstly there is aeronautical infrastructure i.e. runways, control tower, parking apron, and there is also specific cargo infrastructure such as cargo terminals (transit sheds) and infrastructure to facilitate the onward transportation of freight, as well as specialist facilities such as for livestock handling or perishables handling.

The required aeronautical infrastructure is clearly an important prerequisite for any carrier looking to serve an airport and transit sheds with truck access is another minimum element required of an airport. In the latter case though some newly developed airports have looked to attract freighter operators without these facilities, preferring to involve any new operator in the design of future facilities (see section 6.3.4.3).

However, for non-integrated operators this was found not to be the ideal solution. Having the required infrastructure i.e. cargo terminal / warehouse at minimum, in place prior to bringing in freighter operators was found to be a necessity, as the example of MidAmerica airport in section 6.3.4.3 revealed. Freighter operators are much less likely to choose an airport without the necessary facilities, even if these are promised and this is another instance where certainty comes into play. Freighter operators have to make plans in advance of entering a market and therefore need to be certain of as many variables as possible. When the airport decided instead to speculatively build a facility, a greater amount of interest began to be shown in the airport.
A measure of the importance placed on infrastructure by freighter operators, presented in section 5.2.7, is that 60% of the carriers surveyed that had relocated a service did so primarily because another airport had superior facilities. Consistent with this finding and further strengthening the importance of infrastructure as a decision making factor, freighter operators saw infrastructure as something that many airports needed to improve to be viable locations, and this was the second most popular improvement suggested for prospective airports behind lower fees (see table 5.4).

Whilst there is a strong requirement for airports to have the minimum infrastructure, there is less general dependence on a location having specialist facilities. Whilst much was made of the growing importance of intermodal facilities in the literature (section 2.3.4), this did not register as an issue in airport selection for any of the airlines interviewed and was the least important of all the factors in the survey with only 18% stating this to be of importance to their location decisions (see table 5.1). As for other more specialised facilities, these could only be described as important on a 'need to use' basis i.e. of little influence to those carriers not requiring them but of utmost importance to the carriers that do.

8.7.4 The freighter prospects of different types of airport

Proposition 8 contends that non-integrated freighter operators have a systematic preference for major gateway airports and secondary airports will find it difficult to succeed in attracting such carriers without the aid of either environmental legislation or congestion at a major hub.

The research has largely agreed with this proposition showing that the larger airports with concentrations of passenger and freighter operators have a distinct advantage with regards to attracting new freighter operators, both from their typically advantageous locations close to cities and from the economies of locating with other firms at such locations as shown in section 6.2.3.

The empirical findings on the importance of operating to a major airport replicate the benefits displayed in table 3.1 and discussed in section 3.6. These benefits including
maintaining market share, cost savings, better information sharing, and reduction of uncertainty provide a strong explanation of why freighter operators converge on major airport locations. Furthermore, as the theory chapter showed these locations generate industry around them creating more demand for freighter services, making it very difficult for smaller airports to attract freighter operators regardless of their marketing practices.

So what realistic chances do the secondary and tertiary airports have of attracting non-integrated freighter operators in the face of this seemingly magnetic attraction they have to major airports? Clearly they stand to benefit if the major airports are no longer able to support air cargo expansion, either through reaching capacity as shown in sections 6.2.4 and 6.3.4, or by being restricted by legislation as sections 5.3.5, 6.2.6, and 6.3.6 show.

Another factor contributing to the growth of freighter services at secondary airports though is the presence of integrated carriers with a hub operation which acts as a surrogate for the localisation economies of a major airport as described earlier in this section.

Smaller airports without such an advantage can still increase their chances of attracting freighter operators though by attracting "anchor companies"; dominant firms that act as magnets for other companies. An integrator could be considered an anchor company, but so too could forwarders and trucking companies. Forwarders are discussed in detail later in this chapter, but attracting ground freight in the form of trucking companies is another way to recreate the economies of a major airport at a smaller location. Hahn Airport is one such example (see section 2.4.6) where the airport has focused as much on attracting ground freight as it has on attracting air freight and the result of this mixed strategy has been to attract a major trucking operation from Air France and subsequently a number of high profile air freight operators. Airports should therefore understand the importance of trucking and consider working to attract road freight as well, which generates profit in its own right and also acts as an attraction for cargo airlines.
8.7.5 Discussion outcomes

- Freighter operators place a great emphasis on the reputation of the airport as a means of reducing uncertainty in the face of perceived discrimination in favour of passenger carriers (section 8.7.1).

- The cargo reputation is most influential on location decisions when a freighter operator is comparing between two or more similar locations as this factor would be less likely to override potential profit gains at a major airport versus a more remote secondary airport (section 8.7.1).

- Congestion is a key disincentive but the impact of this depends on the nature of the carrier. Long haul operators, combination carriers, and airlines reliant on feed from other carriers, are least likely to be impacted in their location by airport congestion providing access to the airport is still available (section 8.7.2).

- A transit shed with truck access is the minimum infrastructure required for an airport to attract non-integrated freighter operators (section 8.7.3).

- Freighter operators find that many airports have poor cargo infrastructure and improving this is viewed as a key area of differentiation between otherwise comparable locations (section 8.7.3).

- Localisation economies will continue to attract non-integrated freighter operators to the major airports, although environmental and slot restrictions will see a shift to alternative airports in many areas over time. By attracting other freight companies airports can accelerate this process (section 8.7.4).

8.8 The impact of legislation on location

In terms of the stages of making a location decision, an assessment of the potential impact of legislation, i.e. environmental restrictions, bilateral restrictions or politics, is considered relatively early in the process. However the extent to which these interventions actually impact location decisions is open to discussion as the literature in chapter 2 suggests freighter operators are consistently hampered in this way, yet the experiences of carriers in this research suggest a lesser impact.
8.8.1 Environmental restrictions

Whilst it is certainly the case that freighter operators are restricted in their locations by environmental restrictions, as the literature suggests, the findings demonstrate that such interventions are very much of a regional nature and not as prevalent globally as found in the existing literature. That said, freighter operators placed the ability to operate into an airport at night as their number one airport choice factor (see section 5.2.2), although the subsequent research plays down the influence of this factor when explained. The international nature of the survey means that most of the surveyed carriers operated at night in some markets and were therefore sensitive to any restrictions on such operations. However the interviewed carriers felt that this was not a systematic issue, but merely a localised one in some regions (see section 6.2.6.1).

From the airport perspective too the finding from the literature that airports must have 24 hour access in order to attract freighter operators was found to be over-emphasised and there is indeed confusion over the need for night flights for cargo. For integrated carriers 24 hour operations are crucial, but for non-integrated carriers night bans do not necessarily equate to lost business en masse, with this issue being judged according to the individual needs of the particular carrier, i.e. some airlines would be fundamentally affected by night bans and many others would not be affected at all. This was manifested in the interviews with MK Airlines, whose network means night bans would leave their aircraft on the ground losing money, finding it absolutely imperative that an airport had 24 hour operations, whilst other carriers such as Dragonair operate into night restricted airports in Europe without being in any way affected (see section 6.2.6.1).

Where an airline needs to operate at night then an airport restricting such operations is a clear barrier to that airline choosing that airport. However where a carrier does not require night operation capability, restrictions at an airport will not be a factor and there is little middle ground in this regard. Typically the restricted airports are the major ones given they are often located closer to urban areas and there is evidence of secondary airports benefiting from this (see section 6.3.6). This adds to the evidence supporting proposition 8 that secondary airports are most likely to succeed where major airports are restricted by legislation.
8.8.2 Policies and politics

A more fundamental problem for some airports beyond environmental restrictions is the negative operating environment that can be created through the political landscape in the region the airport is located. In particular a political environment where strike action is common or where long term plans can be undermined by the threat of sudden stringent operating restrictions on environmental grounds, are major deterrents for freighter operators.

This was not cited in the literature chapter, but direct evidence of the impact both the above situations can have was uncovered in the interviews (section 6.2.6.3). French airports in particular suffer from constant threats of militant strike action and this is a specific reason MK cited for not operating to Vatry Airport. Whilst there are centrality issues involved too, the militant workforce in France must also take some responsibility for the lack of freighter activity in that country compared with neighbours Germany, the Netherlands and Luxembourg. Equally the political landscape of Belgium with the Green Party controlling key areas, as stated in the interviews (see section 6.2.6.3), provides carriers with uncertainty as to the future environmental restrictions at their airports, particularly given the history of sudden changes at Belgian airports such as Brussels, which has partially been responsible for DHL downsizing its Brussels hub.

8.8.3 Air service agreements

Restrictive air service agreements are a barrier for freighter operators operating in international markets, whether they prevent a desired service outright or dictate from which airport a service must operate.

The literature described the barrier of air service agreements (ASAs) and fifth freedom rights to the operation of desired triangular routes as a fundamental impact on the route networks of freighter operators (see section 2.4.2) and this proved to be the case with 72% of freighter operators surveyed claiming to have been prevented from operating to an airport because of ASAs (see section 5.2.5.1). This issue was
found to be particularly pertinent to carriers operating long haul services, typically as they involve international markets, but also because they often find an imbalance in loads in one direction thus requiring triangular routes and therefore fifth freedom rights.

In many cases desired routes can therefore not be operated, but in other cases the same markets can be served but from different airports than originally desired. The literature (section 2.4.3) identified how airports located close to airports in neighbouring countries with less restrictive regimes found it much more difficult to attract freighter operators for this reason. This is clearly demonstrated by the fact that 7 out of 8 Canadian airports surveyed, who are typically much more restricted by air service agreements, felt disadvantaged by legislation compared with just 2 out of 13 US airports (see section 5.3.5).

ASAs force freighter operators to make 'satisficing' location decisions and such bilateral restrictions have fundamentally shaped the route networks of many carriers, which serves to undermine the location choices discussed as the core of this research. For airports too it is not a level playing field. Freighter operators are influenced by traffic right restrictions at some airports which is artificially supporting other airports in more liberal countries (see section 6.2.6.2). For example Luxembourg Airport is served by MK Airlines as it has open skies with many countries, yet the airline claims it would not otherwise operate there due to the high costs involved.

For the smaller airports an open skies policy would lift restrictions on airlines operating to them and make them much more viable locations for international freighter service (see section 6.3.6.1) as it would mean more global routings could be created which would mean freighter operators did not have to concentrate on the main origin-destination markets as they do at present.

The exact extent of the influence air service agreements have on the geography of freighter operators is difficult, maybe impossible to accurately measure until such a time as markets are opened up or the air cargo industry is able to negotiate its own agreements separate from passenger operations. However it is not unreasonable to assume, given the responses in this thesis, that many airports have suffered from these
restrictions just as many others have benefited, and that the geography of freighter operators at airports would have been different in the absence of bilaterals.

### 8.8.4 Discussion outcomes

- Non-integrated freighter operators do not rely on 24 hour operations to the extent of the integrators, hence airports with night bans are not automatically dismissed by non-integrated carriers (section 8.8.1).

- Where a carrier is required to operate a service at night, finding an airport with 24 hour operations becomes a priority and overrides other traditionally significant factors. For carriers not operating services into a region at night this factor has minimal influence (section 8.8.1).

- The locational influence of noise restrictions has diminished as national and international standards have been introduced, with the main issue being noise quotas, which as above only impact a select number of carriers, albeit fundamentally (section 8.8.1).

- A militant workforce or unstable political environment generates uncertainty which creates a barrier to freighter operators wanting to operate in that region and therefore adversely affects the chances of airports in those regions attracting freighter operators (section 8.8.2).

- The route networks of international carriers are fundamentally affected by air service agreements. International carriers are often left with no choice of airport by ASAs undermining all other decision factors and benefiting some airports at the expense of others (section 8.8.3).

### 8.9 Airport Air Services Marketing

**Proposition 9** states that marketing aimed at potential freighter operators can increase the chances of airports attracting such carriers. This discussion therefore focuses on establishing the true effectiveness of airport marketing, including the offering of incentives, in order to establish whether this proposition is founded. The relevance of
airport marketing is also discussed, i.e. based on the knowledge of what freighter operators consider in their location decisions, are airports targeting their marketing on the right areas?

### 8.9.1 Effectiveness of airport marketing

The initial view presented in this thesis from chapter 2 is that airports can have a degree of influence on the location decisions of freighter operators through marketing. This however was felt to be limited with the proviso that airline decision makers have the final say on the operation of a new route and their decision may be influenced by factors outside the airport’s control (see section 2.4.5). This chapter has demonstrated how freighter operators are influenced by factors outside the airport’s control, but also that marketing does have an influence on locations, although not necessarily in the direct way that has been previously thought.

24% of airlines surveyed claimed marketing had attracted them to an airport that they had otherwise not considered (see section 5.2.6.1), which can be seen as an endorsement that this activity is proving successful. Viewing this figure in context with the findings from sections 6.2.7 and 7.8, reveals that marketing ultimately cannot make an airline go where they don’t want to, but can act to better inform freighter operators and reduce uncertainty surrounding certain locations.

The importance of marketing in this regard comes from the finding that the airport’s attitude towards cargo is an important decision making factor for freighter operators, and an airport that has not proved itself with cargo is a less ideal location as it introduces uncertainty with regards to the potential airline-airport relationship and also the level of success the airline can expect to have. Therefore conveying an enthusiasm for cargo through marketing is very important for airports and perhaps the way in which marketing is most effective.

Whilst in the main airport marketing has been found to be mostly symbolic, it can have a greater locational influence if it is effectively targeted at specific airlines that have the right characteristics to survive at the airport in terms of the markets they will
operate between. The airport interviews highlighted instances where airports had targeted specific freighter operators that perhaps have little chance of operating to the airport and succeeding if they did (see section 6.3.7). Marketing will be clearly most effective, and certainly most efficient in terms of funds, if targeted at carriers that can serve a stated demand (as chapter 7 showed) and this is where the importance of links with shippers and forwarders manifests itself; for airports to understand exactly which markets the demand exists.

The extent to which demand can be effectively used to target a particular freighter operator for a service is conveyed with the example of how DFW Airport used targeted marketing to attract China Cargo Airlines. By being familiar with the needs of the local shippers and knowing where they most needed direct services, the airport could focus its marketing activates on the overseas airlines that could provide services to DFW from the regions most demanded.

When referring to airport marketing and its effectiveness and importance, a distinction needs to be made between different types of airport. The research finds that major hubs, secondary airports with integrator operations, and other smaller airports have a differing reliance on marketing to attract freighter operators. Marketing is less of an important aspect in developing air cargo services once a critical mass of carriers is reached and the economies of agglomeration take hold and an element of uncertainty diminishes (see section 6.3.3.2). The larger gateway airports and those with an integrator hub therefore do not rely on marketing as much and for these airports it could be described as less effective, compared with the other magnetic forces drawing freighter operators to their runways. In the interviews both Manchester Airport, the busiest airport interviewed in terms of non-integrated cargo traffic, and MidAmerica St Louis Airport, the smallest airport with no freighter traffic, agreed with this both in terms of their philosophies and their actions.

This upholds proposition 9 which not only states that marketing aimed at potential freighter operators can increase the chances of airports attracting such carriers, but also that secondary, lesser known airports have to be most proactive in marketing terms but also have the most to gain from such activity.
8.9.2 Impact of incentives

Offering incentives to freighter operators is clearly a common practice with only 8 out of the 40 airports surveyed claiming they had never used this method to attract freighter operators (see section 5.3.6). The question is how effective are they and do they actually work?

The fact that three quarters of the freighter operators surveyed claimed a financial incentive was important when choosing an airport (see table 5.1) suggests they are a factor in determining the locations of non-integrated freighter operators. As with general marketing though, the feeling from freighter operators when interviewed is that incentives are more symbolic than of direct locational influence and all the evidence points towards them not being enough to change a decision in the face of other factors. To substantiate this point, even the airports interviewed accept that incentives have minimal influence (see section 6.3.7.2).

The interviews also strongly suggested that an absence of incentives was more of a locational influence against operating to an airport than they are in positively persuading carriers, with airports having to offer them to reflect the level of their competitors. In cases where airports do have direct competitors nearby, even the smallest advantage an airport can gain may be crucial and therefore incentives may take on a greater importance in these circumstances. On the whole though they are considered by airlines to be “part of the package” and a bonus, but are certainly not a direct influence on their locations at the values quoted in the research.

Incentives would be seen as more valuable if they were less focused on short term financial savings and more on incentives that help airlines grow services at an airport. Indeed airlines did not appear to be as interested in short term fee reductions as they were in receiving help to establish their operations and grow them over the medium-long term (see section 6.2.7.2). Whilst DFW Airport offered marketing support, none of the airports in the interviews chapter offer anything other than financial incentives.
8.9.3 Relevance of airport marketing

Whilst airport marketing can be described as being relatively effective over the long term, the relevance of what airports are actually focusing their marketing efforts on vis-à-vis what the freighter operators view as important, is another matter.

From the discussion in this chapter, there are three primary areas which freighter operators focus on when locating a service. These are geography, profit (an amalgamation of revenue from demand and costs), and certainty. Each of the main factors relating to the location of cargo airlines stems from one of these three issues, and therefore this is where airport marketing should be focused. Whilst every airport is different and some have been more relevant in their marketing than others, a pattern has emerged from the research regarding the relevance of airport marketing activities.

The main marketing priority of all airports is to convey their geographic location and its proximity to motorway networks and areas of demand such as large cities, which is clearly relevant to freighter operators and featured predominantly in airport marketing (see sections 6.3.1 and 7.7). Airports are also effective in marketing their facilities and promoting cost savings, as well as conveying the presence of other freighter operators which is important given the theoretical and empirical significance of other carriers and for providing a level of certainty.

Of utmost importance though is to highlight where freighter operators can improve, and where airports are being least effective is by not focusing marketing enough on the demand for services in their region, specifically with regards to interactions with forwarders and especially shippers, which some airports in sections 6.3.3.3 were shown to place minimal emphasis on. Given the significant impact the research has shown forwarders to have on freighter operator location decisions, this is a particularly relevant area for airports to focus.

As well as marketing to forwarders, establishing an understanding of the needs of local shippers is also very important and using the information this provides in marketing to airlines has shown to be one of the more effective and relevant ways an airport can promote itself, as shown in section 7.7. As Porter (1998b) outlines in
section 3.5, without local manufacturing firms the demand for services is limited, and therefore conveying the requirements of shippers to airlines creates a powerful message to the carrier that the demand is there.

8.9.4 Discussion outcomes

- Airline decision makers always have the final say and marketing from airports is something to consider for them but does not have a fundamental influence on their decisions (section 8.9.1).
- General marketing and the offering of incentives are effective in a symbolic way, by conveying an enthusiasm for cargo which airlines feel important to reduce uncertainty (section 8.9.1 and 8.9.2).
- Where marketing is most directly effective is by showing freighter operators the demand that exists for a potential service. This must however be targeted at airlines that can meet this demand by flying to and from the region where the service is required (section 8.9.1).
- In order to focus effectively on demand airports must engage with shippers and forwarders to understand exactly what the market needs in terms of air services and use this in marketing to the relevant airlines (section 8.9.1).
- The smaller, less developed airports have a greater need for marketing as they do not have the other characteristics that make major airports attractive to freighter operators, and for them marketing is likely to be a greater influence on any decision to locate at such airports (section 8.9.1).
- Financial incentives have been shown to be of minimal influence on the location decisions of freighter operators and the focus should be more on incentives that help freighter operators to establish services, which freighter operators claim would have somewhat more influence on their location decisions (section 8.9.2).
- With regards to conveying their geography and attempting to reduce the uncertainty of operating to their location, freighter operator marketing is relevant. Airports however need to focus more on showing demand, which freighter operators view as particularly important, through attracting forwarders and working with local shippers (section 8.9.3).
Chapter 8 - Discussion of Findings

8.10 Conclusion

This chapter has brought together the empirical research findings and these have been discussed in relation to previous literary and theoretical knowledge on the factors influencing the locations of non-integrated freighter operators. The most important factors have been identified and reasons as to their importance have been discussed. This chapter has therefore provided a basis on which to draw conclusions from the research in the following chapter.
9. Conclusions and Recommendations

9.1 Introduction

Having evaluated the research findings in chapter 8 in relation to the past empirical and theoretical work, this chapter concludes the research by identifying the most important factors influencing non-integrated freighter operators’ choice of airport—the aim of this thesis. Based on the findings, the second facet of this chapter is to identify potential “success factors” for airports to succeed in attracting cargo airlines and to make recommendations to airports on how they can apply the findings of the research in an air services marketing context. Finally as an epilogue to the thesis the contributions to knowledge are discussed as are the limitations of the work, leading to recommendations for further research.

9.2 The most important factors influencing non-integrated cargo airlines’ choice of airport

The list of factors that follows includes impacts that are “positive” i.e. factors that attract the airline to the airport, and factors that are “negative” i.e. those that discourage freighter operators. It is important to make a distinction between factors that cargo airlines actually look for in an airport in order to make a location decision, and those which restrict the locations but are nonetheless influential. By making such a distinction the extent to which freighter operators exhibit ‘satisficing’ behaviour when making decisions can be shown. The list also includes those factors which serve a crucial role in reducing the uncertainty of an airline operating to a particular location, even if they are not of direct influence.

Table 9.1 summarises the factors found to influence the location decisions of non-integrated cargo airlines according to whether they are “positive” or “negative” factors or factors that are more symbolic to reduce uncertainty. In doing so this section satisfies the aim of the research, i.e. to identify the most important factors influencing non-integrated cargo airlines’ choice of airport. With regards to negative
factors they can either be factors that fundamentally restrict the operation of freighter aircraft, in which case they override all other factors, or they can be factors that make an airport less desirable. An explanation of the factors in table 9.1 then follows.

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<tr>
<th>Positive</th>
<th>Negative</th>
<th>Uncertainty</th>
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<tr>
<td>O-D Demand</td>
<td>Bilateral Restrictions</td>
<td>Airport Reputation</td>
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<td>Freight Forwarder Presence</td>
<td>Night Ops Capability **</td>
<td>Airport Advertising</td>
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<tr>
<td>Passenger Airline Ops*</td>
<td>Noise Regulation</td>
<td>Integrator Presence</td>
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<tr>
<td>Presence of Partner Airlines</td>
<td>Infrastructure Availability</td>
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<td>Flying Time/Cost</td>
<td>Congestion</td>
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<td>Access to Market</td>
<td>Militant Workforce</td>
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<td>Location of Competitors</td>
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<td>Airport Charges</td>
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<td>Incentives</td>
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* If the airline operates both passenger and freighter services
** Only where the airline desires to operate night services

Table 9.1: A summary of the factors impacting on cargo airlines' location decisions categorised according to whether they are positive or negative factors or factors that reduce uncertainty.

It is important to note that not all freighter operators consider the same factors when choosing an airport and therefore any attempt to establish a ranking of importance would be irrelevant. What table 9.1 represents is a collation of the factors established in this thesis as being typically influential in the location decisions of non-integrated cargo airlines.

9.2.1 Positive Location Factors

Origin-Destination Demand

It was agreed by the freighter operators participating in this research that their priority is to identify a region to serve based on there being un-serviced demand for air freight in that region. This is based on the assumption that demand, if it can be fulfilled, will
lead to revenue and ultimately profit. If there is no demand for a service or no potential for demand then a freighter operator cannot hope to succeed in that region, making the discussion of other factors meaningless. Clusters have been shown to be a primary indicator of demand if found in the vicinity of an airport, particularly clusters of industries subject to physical and economic perishability or business process impairment or those involved in the transportation of high value goods, as they lead to an increased number of shippers.

**Freight Forwarder Presence**

This was found to be one of the most significant external influence on cargo airlines when choosing an airport as forwarders are the gatekeepers to unlocking the demand and transferring that demand into freight on the aircraft. There was no evidence to suggest that forwarders have to be present on an airport site, but they do have to be operational in an area relatively close to the airport in order to be considered part of an airport agglomeration.

**Presence of Passenger Airline Operations**

For combination carriers, having a passenger presence at one airport in a region makes that airport considerably more attractive for freighter service and therefore more likely to be chosen, provided it has the demand and forwarder presence required. This is due to the economies of scale the airline can gain by combining complementary elements of the two operations such as handling. Information gained from the passenger operation regarding cargo loads also allows for a more informed decision. The presence of passenger airlines is only as important as has been indicated here for combination carriers and it was found that many pure freighter operators did not view the presence of passenger airlines as particularly attractive, with many viewing their presence as a disincentive.
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**Presence of Partner Airlines**

Cargo airlines were found to be receptive to the presence of partner airlines at a particular airport for one of two reasons. Firstly and most importantly are the advantages of seamless onward connections to strategic destinations, which would benefit the loads and yields of both carriers. The other reason is to gain localisation economies from locating close to partner airlines which can extend to joint marketing and economies of information.

**Flying Time and Cost**

The geographic proximity of a specific airport to the other end of the proposed route was found to be a significant contributor to the total cost of a flight and one which allowed significant savings to be made. This is therefore an important factor for freighter operators to consider when operating a service into a multiple airport region. However this must not be at the expense of a location that provides access to high yielding cargo.

**Access to Market**

Being able to reach the market or markets the airport serves as quickly as possible is important for cargo airlines to appease freight forwarders and their promised delivery targets to customers. The overall speed of transit between airport and market is more important than physical proximity, placing a premium on efficient road access and loading/unloading facilities as a decision factor.

**Location of Competitors**

The evidence from the thesis is that cargo airlines are not systematically influenced by the location of competitors when choosing an airport but there are situations where competitors can impact on the decision making process. For example competitors can
alert cargo airlines to demand-laden markets or accelerate their entry into such markets in order not to lose market share. Alternatively there was evidence that a competitor locating at a major gateway airport in a region would make it significantly less likely that an airline would choose a secondary airport serving the same market.

Airport User Charges

The existing literature related to this issue gives a very mixed message as to its influence. This research concludes that the airport user charges can be an influential factor on the location decisions of freighter operators but only if the seven factors highlighted above have not led to a decision already. Their influence may however extend further as user charges appear to have a disproportionate marketing impact and contribute to overall costs and ultimately profit which is the greatest determinant of location.

Incentives

Incentives offered by airports were found to be very common and as such the impact of such incentives are minimised. However incentives were something freighter operators claimed to consider if the incentive was something that would help the airline to establish operations at the airport. Marketing support was one particularly attractive incentive that could impact a decision with all other factors being equal, although this is as far as the influence extends and the more typical financial incentive was seen as much less attractive.

9.2.2 Fundamental Factors Restricting the Choice of Particular Airports

Bilateral Restrictions

Freighter operators viewed air service agreements and the resulting bilateral restrictions as the most fundamental barrier they encounter when choosing airports.
Whilst the continuing liberalisation of worldwide air services will lessen the impact of bilateral restrictions, where they are in place they fundamentally prevent freighter operators from choosing an otherwise suitable airport, hence on the negative side they are the most important and fundamental of considerations.

Night Operations Capability

Airlines that need to operate services during the night time hours need to operate to 24 hour airports. Airports with night bans in place are therefore not available for selection by such an airline. For Airlines without such requirements however, this is not a factor.

Noise Regulation

Freighter operators also consider noise regulations at airports. The aircraft the airline operates must meet any noise limits or quotas established by an airport, otherwise they will be fundamentally restricted from using that airport.

9.2.3 Other Dissuasive Factors

Infrastructure Availability

Infrastructure availability has been considered a dissuasive factor because the evidence from the research is that having the minimum infrastructure of a cargo terminal with airside access and the services to support this is almost universal and would therefore not be considered an issue unless an airport did not have such infrastructure. The same is true where other infrastructure is deemed important to operations. If it is needed and not present then the airport will not be chosen.
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Congestion

The side-effects of airside congestion, i.e. longer hold times, less desirable slot times available and an altogether slower airport throughput, have shown to be a distinctive dissuasive factor for a freighter operator choosing an airport, although not fundamentally. The sensitivity of congestion is dependent on the nature of the airline and their reliance on the typical advantages of a major airport. For example combination carriers or carriers with linkages with other airlines would see more benefit in locating close to their passenger services or alliance partners than detriment from congestion. On the other hand smaller independent airlines with no such linkages would be more sensitive to congestion.

Militant Workforce

Airports in regions with a history of strike action are viewed with caution by cargo airlines due to the possibility of disruption to services and the uncertainty this brings. Whilst many such airports do have freighter services, it was found that freighter operators do take the threat of strikes very seriously in choosing an airport.

9.2.4 Factors Serving to reduce Uncertainty

Airport Reputation

Cargo airlines participating in this thesis placed a great deal of emphasis on the reputation of the airport in terms of choosing which airport to operate to. The reason for this was because they wanted to know they would be operating to an airport that embraced cargo and did not view it as secondary to passenger traffic. This factor is therefore a side-effect of the uncertainty cargo airlines feel about some airports.
Airport Advertising

Whilst airport advertising does have a role in informing airlines of an airport or the facilities and services available, this research found that such information is in many cases already known in what is a relationships-driven industry and where airlines value such advertising most is by conveying an airport’s pro-cargo stance; allaying fears that the airport may be difficult to work with.

Integrator Presence

As the location theory identified, one of the greatest location-related generators of uncertainty is when a location is untried and does not have an established presence of related companies from which to form “case studies” of success. As such, secondary airports that do not have a non-integrated cargo airlines presence provide an element of risk for a new entrant compared with a major airport. For airlines considering secondary airports an integrator hub presence reduces much of this uncertainty by replicating the conditions of a major airport by offering opportunities for connecting flights and providing advanced services and infrastructure.

9.3 Outcome of propositions

The research propositions were establish as a means of focusing the research on a number of key factors that emerged from the work previously conducted in this area, both from a practical and theoretical perspective. These nine propositions are listed again below, together with the outcome relating to each. By focusing on specific and important issues these propositions and their outcomes have played a key role in meeting the aim of the thesis to identify the most important factors influencing non-integrated cargo airlines’ choice of airport. Furthermore by facilitating an examination into the relevance of aspects of current literature and theory, the propositions have enhanced the contribution to knowledge of this thesis.
Proposition 1

*There are three main stages to the location of a freighter service consisting of a decision on which region to serve, followed by an assessment of vetoes and operating restrictions at the airports in that region and finally a detailed assessment of the attributes of the feasible airports.*

This proposition was endorsed by freighter operators and airports alike, although the detailed assessment of the attributes of the feasible airports was seen as having two parts: an assessment of market factors, and an assessment of technical factors.

Proposition 2

*Freighter operators choose regions to operate to based on economic activity and are particularly attracted to regions with a cluster of companies manufacturing or receiving goods suitable for carriage by air.*

The research found that clusters are a primary indicator of air freight demand as they usually account for a major share of the economy within a geographic area, and that freighter operators do choose regions to operate to based on economic activity. The attraction of freighter operators to clusters of industry is at one with the theoretical phenomenon that economic activity in general tends to congregate in cities or large conurbations where the demand for such goods and services is greatest. Airports that are located close to clusters of air freight friendly industry such as technology production, pharmaceuticals, automobile assembly or fashion clothing production have a vastly increased chance of attracting non-integrated freighter operators than airports located away from such industries.

Proposition 3

*Costs are ultimately the most significant factor driving the location decision of freighter operators.*
This was found not to be the case. Whilst costs were an important consideration for cargo airlines, it was found that profit, as a fusion of costs and revenue derived from demand, was in fact the most important factor and cost was merely a contributor to this.

**Proposition 4**

*Freighter operators look to locate alongside competitors*

Whilst this is not the case in all situations, the research found that cargo airlines will choose to operate alongside competitors where they are located at the centre of the market following Hotelling's linear market duopoly model. In situations where a competitor is located at a secondary airport away from the centre of the market the influence of competitor locations is minimised.

**Proposition 5**

*Freighter operators look to locate with their alliance partners for interlining*

Firms locating together in a confined geographical area are said to lead to agglomeration economies resulting in lower costs or increased revenue. The findings from this thesis reveal that airlines are looking to avail themselves of these economies where possible by locating with partner airlines.

**Proposition 6**

*Airlines which also operate passenger flights into the region chosen by the cargo division will have different priorities, choosing to locate their cargo services at the same airport as their passenger flights.*
This proposition was upheld and was found to be one of the most pronounced impacts of having a concentration of other airlines at an airport. Weber (1929) identified the main economies of agglomeration as cost savings through economies of scale. These internal economies of scale gained through the avoidance of duplicating overheads and staff costs, were found to be very important to combination carriers with regards to co-locating passenger and freighter aircraft and they did not want to fragment their freight by operating passenger and cargo operations into different airports.

**Proposition 7**

*Freighter operators will locate where there is a concentration of freight forwarders.*

The empirical evidence upholds this proposition as ultimately the freighter operator seeks a location that will yield the greatest profit and for most carriers the key to unlocking the business to gain this profit is the freight forwarder. Furthermore the influence of the forwarder has become even more profound as freighter operators have begun to develop partnerships with major forwarders which have effectively tied them to major airports where they are present.

**Proposition 8**

*Non-integrated freighter operators have a systematic preference for major gateway airports and secondary airports will find it difficult to succeed in attracting non-integrated freighter operators without the aid of one of two interventions, namely environmental legislation or congestion at a major hub.*

The research has supported this proposition showing that the larger airports with concentrations of passenger and freighter operators have a distinct advantage with regards to attracting new freighter operators, both from their typically advantageous locations close to cities and from the economies of locating with other firms at such locations. The difficulties of less developed airports in attracting non-integrated cargo airlines have also been documented. With regards to the interventions that would lead
a secondary airport to grow its non-integrated freighter presence it was found that environmental legislation and congestion typically affect the major airports most and there was evidence of secondary airports benefiting from this. In addition to these two interventions the presence of integrated carriers at a secondary airport was found to be another factor aiding the success of secondary airports with non-integrated cargo airlines.

Proposition 9

Marketing aimed at potential freighter operators can increase the chances of airports attracting such carriers. Secondary, lesser known airports have to be most proactive in marketing terms but also have the most to gain from such activity.

The research found that marketing does have an influence on locations, although not necessarily in the direct way that was suggested in the literature. It was found that marketing ultimately cannot make an airline go where they don’t want to, but can act to better inform freighter operators and reduce uncertainty surrounding certain locations by conveying an enthusiasm for cargo. Marketing was found to have a greater locational influence if it is effectively targeted at specific airlines that have the right characteristics to survive at the airport in terms of the markets they will operate between. The research concurred with this proposition that marketing can increase the chances of airports attracting freighter operators and also that secondary airports need to be most proactive and have the most to gain from marketing as they do not have the advantageous aspects of a critical mass of carriers.

9.4 Airport “success factors” for attracting non-integrated freighter operators

A key research objective was to identify factors that may potentially lead airports to succeed in attracting non-integrated freighter operators and a number of these factors have been identified in the thesis. These success factors are characteristics that freighter operators value the most in airports and the more of these characteristics an
airport can display, the more chance there is of them attracting non-integrated cargo airlines.

In order to successfully attract non-integrated freighter operators airports should possess as many of the following characteristics as possible:

- Direct highway access to the main areas of demand.
- A strong concentration of freight forwarders either on the airport site or close by.
- Existing cargo services at the airport (does not necessarily have to be air cargo – can be a trucking operation).
- An integrator presence - particularly important for secondary airports as it replicates the major airport advantages i.e. the agglomeration effects of other carriers.
- Passenger airlines at the airport operating long haul services with wide body aircraft
- 24 hour services
- A liberal noise regime
- Have sufficient capacity for new services
- A positive reputation for cargo established over time through experience of handling cargo aircraft or through consistent marketing showing a desire to attract such services.
- A fully operational cargo terminal in place (or in advanced planning) with required support services such as handling agents.

9.5 Implications for airports: Suggested marketing improvements

As well as identifying the factors that influence the geography of non-integrated cargo airlines and the qualities that increase airports chances of attracting such carriers, this thesis has also identified where airports can improve from a policy perspective in terms of the way they market themselves and the actions they take to grow their cargo business. Whilst many airports will already be implementing the issues raised in this section, the research finds that many airports are not.
The specific suggested policy improvements are outlined below and have emerged from improvements suggested by airlines in chapters 5, 6 and 7 as well as from comparing the factors airlines find important with the actual actions of airports.

- **Marketing** an airport to freighter operators should be seen as a long term process and immediate results cannot be expected given the often long term nature of cargo airline location decisions.

- The main focus of airport marketing should be on showing demand (and therefore potential revenue) with perhaps less emphasis on promoting low costs. Airports should not only focus on linking demand with the airline's home or potential destination markets, but also markets that can be served through available connections.

- Airports cannot effectively market themselves to freighter operators unless they understand the existing freight flows and origin-destination of the freight in their area. Therefore this information, if available, should be obtained and used. Where not available this is where local and regional authorities could have a positive impact on "their" airport. If they accept air freight as a strong generator of economic growth, as is argued to be the case by economists and industry experts alike, then funding for such studies which could increase freighter activity, and ultimately grow the local economy.

- Marketing will be clearly most effective, and certainly most efficient in terms of funds, if targeted at carriers that can serve a stated demand rather than treating the sector uniformly and this is where the importance of links with shippers and forwarders comes in, for airports to understand exactly which markets the demand exists.

- Airports without a strong forwarder base could direct attention to attracting freight forwarders as well as freighter operators in order to establish themselves as a location where airlines can take advantage of agglomeration economies, particularly given the growing trend of freighter operators establishing preferred partnerships with major forwarders.

- Airports should understand the needs of the shippers in their area in order to more effectively market to carriers who can meet these needs.
Chapter 9 - Conclusions and Recommendations

- Airports should not only focus their marketing on air freight carriers. Attracting anchor companies, e.g. road freight operators, integrators, gives the airport a greater chance of being chosen by non-integrated cargo airlines.
- Airport user charges could be kept in the price range of competing airports if possible.
- Airports with monopoly handling suppliers should encourage competition in handling in an attempt to force lower handling charges to the airline which therefore lowers the overall costs for an airline operating to their airport.
- Incentives could be based on providing support to establish cargo services rather than focused on short term and unsustainable financial discounts.
- Airports should have an active interest in government negotiations over air service agreements and be able to lobby government to try to benefit from such agreements at such times when they are renewed in order to minimise their negative impact.

9.6 Concluding Remarks

The aim of this thesis has been to identify the most important factors influencing non-integrated cargo airlines' choice of airport. The factors which this thesis has found to influence cargo airline locations were summarised in table 9.1. This research concludes that where there are no restrictions on any of the airports that an airline is considering, it is the location that has the potential to yield the airline the greatest profit that will be chosen. There are two primary inputs into determining the potential profit of an airport that airlines will use. First the costs of operating to the airport, including airport user charges, other airport-related charges such as handling, and most importantly the flying-related costs such as fuel, aircraft lease rates and labour. The other input is revenue and this is estimated through an assessment of the demand for a freighter service from local industry. It is therefore not necessarily the lowest cost airport that is chosen, particularly if this airport is in an area of low demand.

Examining all of the primary factors that non-integrated cargo airlines consider, there are three areas which they focus on when locating a service. These are geography,
profit (and therefore cost as well as demand) and certainty. Each of the main factors relating to the location of cargo airlines stems directly or indirectly from one of these three issues and this is therefore where airports will have most success with their marketing by showing that their airport is geographically linked to areas of high demand, is competitive in terms of costs and has a proven track record for handling cargo aircraft. The research has shown that airports that have these advantages and can successfully convey them to freighter operators can succeed in influencing airlines to operate to their airport. The paradox though is that the airports that need to make use of marketing the most are those without the central location or the agglomeration of existing carriers. A key finding is that airport marketing is less of an important aspect in developing air cargo services once a critical mass of carriers is reached and the economies of agglomeration take hold and an element of uncertainty diminishes. This explains why the busy cargo airports continue to get busier regardless of marketing whereas the smaller secondary airports in particular need to consider most the findings and recommendations of this thesis.

9.7 Recommendations for further research

This thesis addresses an area that has been under researched and as such there is significant scope for further related research that would build upon the findings of this thesis.

This thesis has focused solely on the locations of non-integrated cargo airlines and there has been a much greater body of work into the hub locations of the integrated carriers. What emerged from this research is that airports require different characteristics to attract these two types of freighter operator and from an airport perspective it would be beneficial to understand exactly what these differences were and perhaps how they can work to converge these two types of carrier at one location. Therefore a comparative study between the needs of the two types of carrier would be a beneficial extension of this thesis.

As chapter 3 shows, the main body of work on location theory has become somewhat dated and focused on manufacturing industries which ignores the significant service
Chapter 9 - Conclusions and Recommendations

The research has highlighted a real need for location theorists to provide a better explanation of the location of services in the world today. From the coverage of the subject in this thesis, it is suggested that a fusion of Hotelling’s work on competition with that of cluster theory would be an appropriate initial approach.

One of the most significant external influences on the locations of cargo airlines was found to be freight forwarders and where they establish their main bases. An extension of this research could be to examine the reasons behind freight forwarder location decisions and to compare the main locations of freight forwarders with those of cargo airlines to highlight in practical terms the influence each has on the other.

This research found that in order to market effectively to potential cargo airlines, airports needed to be able to identify the origins and destinations of the freight flows in their area in order to convey that there is a specific demand for their services. However such information was found to be difficult and expensive to obtain. An extension to this research would be to work with an airport to identify this information and implement it into their marketing practices.

Testing the findings of this research in practice is another potential extension to the thesis. In particular the impact of legislation can be verified by assessing the cargo fortunes of nearby airports subject to different legislation. For example in Europe there are airports in countries that have open skies agreements with a great number of countries, e.g. Luxembourg which are located close to countries that do not. Such examples can be analysed worldwide to establish the true impact of legislation. Similarly the links between airports in regions with a militant workforce and cargo activity can be compared with cargo activity in regions with no such problems.

9.8 Contribution to Knowledge

As stated in chapter 1, the area of airport choice for non-integrated freighter operators is an under researched area and therefore this research has a significant scope to
Chapter 9 - Conclusions and Recommendations

contribute to academic knowledge on the subject and chapter 8 discussed the research findings in the context of the existing literature.

This thesis has contributed much to the current knowledge in its field. For example it represents the first time that the question of why cargo airlines choose particular airports has been investigated on a worldwide scale; through international surveys which have been completed and returned from all areas of the globe, including traditionally difficult areas to access such as China and the Commonwealth of Independent States. Such a global perspective shows the complexity of the decision process facing global airlines in different markets rather than focusing solely on narrow regions.

This thesis has also made an important contribution to theoretical knowledge, fusing as it has a modern day issue with both 'classical' and contemporary location theories, finding that such theories can provide a relevant underpinning in a modern day context, even if ultimately they fall short in terms of effectively explaining the location of transportation services.

Critically though the research also has a significant practical purpose and the views of many of the airports involved in the research cement the importance of the thesis in terms of assisting them to attract cargo airlines. Below is some of the positive comments received from airports who feel the research will help them to grow their respective businesses:

"Your thesis is critical to understanding the air cargo world and the complexities that exist in new markets".
Tim Cantwell – Director, MidAmerica St Louis Airport

"We have a corporate goal of doubling our volumes within 5 years and I'm sure some of your findings will be useful in helping me reach that objective".
Andrew Lyall – Cargo Specialist, Halifax International Airport

"I would think many airports will find your study informative, given the crucial element of comparing what airports are doing to what their business
partners/customers actually need and find important (the same as in any line of business of course)".

Ryan Yada - Program Manager - Airports, SNC Lavalin Inc.

"Air cargo is a rapidly changing area and one where much research is needed. This paper begins to address how location decisions are made -- an important contribution".


These views have been cemented by the publication of papers in two refereed international journals based on the findings of this research, namely Transport Reviews, titled 'Freighter operators' choice of airport: a 3 stage process' (Gardiner et al., 2005a); and the Journal of Air Transport Management, titled 'Factors influencing cargo airlines' choice of airport: An international survey' (Gardiner et al., 2005b). A presentation was also made at the 2004 Transportation research Board Annual Meeting, titled 'The multitudinous nature of air cargo operators' choice of airport'.


GDC (2003). *Dallas/Fort Worth Metroplex Regional Profile*. Greater Dallas Chamber, Dallas, TX.


Hall, R. (2002). *Alternative access and locations for air cargo.* Department of industrial and systems engineering, University of Southern California, Los Angeles, CA.


MidAmerica Airport (2004). *Presentation to Mayor Kern.* MidAmerica St Louis Airport, Belleville, IL. October.


APPENDIX A

MAIL QUESTIONNAIRE SENT TO 118 NON-INTEGRATED CARGO AIRLINES

PAGES 315-320
Freighter Operators: Airport Choice Survey

This questionnaire forms an integral part of a major academic research project supported by TIACA, examining the factors that influence the airport location decisions of freighter operators.

Completing this survey...
- Please answer the questions by putting a tick ✓ in the appropriate box or by writing your answer in the space provided, unless otherwise indicated.

Q1 (a) When deciding on an airport to serve, is the final decision made by ...

☐ An individual (Answer part b)  ☐ A team of individuals (Go to Q2)

(b) If you indicated that decisions are made by a single individual, please state the position of that person within your organisation.

..................................................................................................................

Q2 When evaluating airports to operate cargo services to, how important do you consider the following?

Please circle the appropriate number based on the following scale:

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<th></th>
<th>Extremely unimportant</th>
<th>2</th>
<th>Unimportant</th>
<th>3</th>
<th>Neither important nor unimportant</th>
<th>4</th>
<th>Important</th>
<th>5</th>
<th>Extremely important</th>
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<tr>
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<td>Origin-destination traffic generated by local industries</td>
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<td>The reputation of the airport for handling freighter flights</td>
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<td>Operating to the airport that incurs the least overall cost</td>
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<td>Customs clearance times</td>
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<td>Ability to operate aircraft into the airport at night (23:00-06:00)</td>
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<td>Average delay per aircraft movement</td>
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<td>Airport weather record</td>
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<td>Availability of intermodal facilities (e.g. rail interchange)</td>
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<td>A financial incentive from the airport e.g. reduced landing charges</td>
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<td>Trucking costs between the airport and the main markets</td>
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<td>Trucking time between the airport and the main markets</td>
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</tr>
<tr>
<td>Operating to the airport in a market that minimises flying time</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The need to locate at a major airport</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Please turn over...
Q3 (a) How important is it to have a concentration of freight forwarders at the airports you operate to?

- [ ] Extremely important
- [ ] Important
- [ ] Neither important nor unimportant
- [ ] Unimportant
- [ ] Not at all important

(b) Please could you explain the reasons for your answer to part (a)

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Q4 (a) In addition to pure freighters, does your airline operate passenger flights?

- [ ] Yes (Answer part b)
- [ ] No (Go to Q5)

(b) If you answered Yes above, how does the location of these services affect your choice of airport?

- [ ] We always co-locate our freighter and passenger flights at the same airport
- [ ] We try to co-locate our freighter and passenger flights but often find this is not possible
- [ ] The location of our passenger services does not influence our freighter locations

Q5 (a) Have you formed any strategic alliances with other carriers with specific focus on cargo cooperation?

- [ ] Yes (Answer part b)
- [ ] No (Go to Q6)

(b) If you answered Yes above, has the location of your partner(s) ever influenced the airport you choose for a particular service?

- [ ] Yes (Please elaborate below)
- [ ] No (Go to Q6)
Q6 (a) In general, how effective do you believe airport marketing (e.g. personal approaches) to be in attracting new cargo services?

- [ ] Extremely effective
- [ ] Effective
- [ ] Neither effective nor ineffective
- [ ] Ineffective
- [ ] Extremely ineffective

(b) Has such marketing ever attracted you to an airport that you would otherwise not have operated to?

- [ ] Yes (please elaborate below)
- [ ] No (Go to part c)

(c) Of the airports that you have operated to, how common is it for you to receive a financial incentive (such as reduced landing charge) to commence a service?

- [ ] Extremely common
- [ ] Common
- [ ] Neither common nor uncommon
- [ ] Uncommon
- [ ] We have never received such an incentive

Q7 (a) How important are competitive airport user charges to your location decision?

- [ ] Extremely important
- [ ] Important
- [ ] Neither important nor unimportant
- [ ] Unimportant
- [ ] Not at all important

(b) On average approximately what percentage of the cost of a single aircraft rotation is made up of airport charges?

........... %

Q8 To what extent have the following influenced your past location decisions?

Please circle the appropriate number based on the following scale:

<table>
<thead>
<tr>
<th>1</th>
<th>No influence at all</th>
<th>2</th>
<th>Minimal influence</th>
<th>3</th>
<th>Some influence</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Significant influence</td>
<td>5</td>
<td>Total influence</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>The presence at an airport of a particular handling agent</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>The availability of infrastructure at one airport over another</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>A company providing a base-load contract</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Support from local or national government</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

Please turn over...
Q9 (a) When evaluating an airport for a new service, to what extent does the airport chosen by competitors operating in the same markets influence your decision?

☐ Total influence  ☐ Significant influence  ☐ Some influence

☐ Minimal influence  ☐ No influence at all

(b) Please indicate the implications of your competitors' location decisions.

☐ We endeavour to locate at the same airport to provide direct competition

☐ We look at different airports in the same market to avoid direct competition

☐ We look at different markets altogether

☐ Their decisions do not affect us

☐ Other (please specify) ..................................................................................................................

Q10 Have air service agreements, e.g. bilateral agreements between two countries, ever prevented you from operating to an airport you would have otherwise chosen?

☐ Yes  ☐ No

Q11 (a) How restrictive have you found the current policy of combining traffic rights for passenger and cargo carriers when locating cargo services?

☐ Extremely restrictive  ☐ Restrictive  ☐ Somewhat restrictive

☐ Not too restrictive  ☐ Not at all restrictive

(b) Would you make changes to your route network if traffic rights for cargo were separated from passenger rights?

☐ Yes  ☐ No

Q12 (a) From your experience, do you feel that airports give cargo airlines lower priority than passenger airlines?

☐ Yes (Answer part b)  ☐ No (Go to Q13)

(b) If you answered Yes to part (a), in what ways do you feel cargo airlines are given lower priority?

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Please turn over ...
Q13 (a) In the past 2 years has your airline relocated a cargo service from one airport in a particular region to another?

☐ Yes (Answer part b)  ☐ No (Go to Q14)

(b) If you answered Yes above, please indicate your main reasons for doing this.

Tick all that apply

☐ Increase in charges
☐ Lack of capacity for expansion
☐ Environmental restrictions (noise/night flying)
☐ Pressure from an airport operator to move to another of their airports
☐ Pressure from government to move to another airport
☐ Customer demand
☐ Better facilities elsewhere
☐ Lower charges elsewhere
☐ Other (please specify)

Q14 (a) Please indicate whether you agree or disagree with the following statement...

"When evaluating new routes we first assess to which region we wish to operate the service before assessing the possible restrictions at potential airports (such as capacity constraints, environmental restrictions etc.) Only then do we look at the individual attributes of the remaining airports"

☐ Agree (Go to Q15)  ☐ Disagree (Answer part b)

(b) If you disagree with the statement, please indicate the stages your airline goes through when selecting a new airport.

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Q15 When you are next evaluating airports to serve, what will be the three most important aspects you will consider when making your choice?

1 ..........................................................................................................
2 ..........................................................................................................
3 ..........................................................................................................

Please turn over...
Q16 In light of your overall experience of airports and their interaction with freighter operators, what could an airport do to attract your business?

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Q17 If you have any further comments regarding your choice of a destination airport for your cargo services, please use the space provided below or an extra sheet if required.

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Q18 Would you be interested in ...

Please circle yes or no as appropriate:

<table>
<thead>
<tr>
<th>Participating further in this study?</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Receiving a summary of the findings of this research when available?</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

If you answered yes to either of the options above, please write your details in the space provided or attach your business card to enable me to contact you:

<table>
<thead>
<tr>
<th>Name:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Job Title:</td>
<td></td>
</tr>
<tr>
<td>Organisation:</td>
<td></td>
</tr>
<tr>
<td>Email:</td>
<td></td>
</tr>
<tr>
<td>Telephone:</td>
<td></td>
</tr>
</tbody>
</table>

Thank you for taking the time to complete this questionnaire. Your responses will be kept confidential. Please return the questionnaire in the envelope provided, or send to:

John Gardiner
Researcher, Transport Studies Group
Department of Civil & Building Engineering
Loughborough University, Leicestershire, LE11 3TU, United Kingdom

If you wish to discuss any of your comments further or want to ask any questions regarding this research, please feel free to contact me by telephone on +44(0)1509 263172 Ext. 4681 or by email J.R.Gardiner@lboro.ac.uk, or visit www.aircargoresearch.co.uk for more information.
APPENDIX B

JUSTIFICATIONS FOR AIRLINE SURVEY QUESTIONS

Question 1

This particular question arises from the economic rational concept of decision making (Keen and Scott Morton, 1978). Here there is an assumption of a rational, completely informed single decision maker who makes an optimal decision.

It is important to know who makes the decisions, not only to test whether this concept of a single decision maker holds true, but also to gain an insight into the process of a decision which will aide the case study research. Here knowledge of whether decisions are made by an individual or a team and who the individuals concerned are will be particularly valuable.

Question 2

The primary purpose of question 2 is to test the importance of a set of factors recognized from the literature chapter to be of potential importance and to ascertain how important they actually are.

Quality of road access to the airport: This is often the most prominent tool used by airports marketing themselves to airlines, showing their proximity to X% of the national industry. Finding out just how important this is, particularly in comparison with other factors will show whether airports are targeting their marketing efforts in the most appropriate place.

Origin-destination traffic generated by local industries: This is testing the belief from much of the literature that freighter operators look to locate at an airport that has
a high customer base around it and links with the theory on clusters and how magnetic such concentrations of industry are to freighter operators.

**The reputation of the airport for handling freighter flights:** As well as playing on their location, some airports also place a great deal of emphasis on their experience of handling cargo flights in their marketing efforts. Again it is important to test whether freighter operators place the same emphasis on this.

**Operating to the airport that incurs the least overall cost:** This question is based on Weber's least cost theory of location which assumes that industrialists choose a least cost location for the development of new industry. The theory is that when choosing a location a firm will seek an appropriate amount of information regarding the costs and benefits of a location in order to help them with their decision. This question seeks to test the relevance of this theory.

**Customs clearance times:** This is mentioned several times in the literature review chapter and this question seeks to affirm the importance of this factor.

**Ability to operate aircraft into the airport at night:** This is one of the dominant issues raised in the literature with various authors suggesting that airports that have few restrictions on night flights will be best positioned to attract cargo services. This question seeks to identify just how many cargo airlines actually see this as important.

**Average delay per aircraft movement:** This is testing the finding from the literature that airports with a history of delays are unattractive to freighter operators.

**Airport weather record:** The literature suggests that when locating hubs the weather at the airport can be a consideration as persistent inclement weather means more delays.

**Availability of intermodal facilities:** The literature suggests that cargo airlines find this important, yet in reality few airports have such facilities. This question therefore tests whether this is actually important or not.
A financial incentive from the airport: Prior discussions with representatives from cargo airlines suggested that airports offering airlines reduced landing charges to establish a new service is a relatively common occurrence and indeed some airports openly offer reduced charges for services to new destinations. This question tests how important the cargo airlines view this.

Labour availability: The availability of labour affecting location choice is identified in the literature, particularly by Hall (2002) who found that carriers operating from Los Angeles found it easier to retain skilled employees. This question seeks to examine whether Hall's finding can be generalised across a greater population.

Labour cost: Weber (1929) considered labour costs as part of his overall 'least cost' principle. Once a least cost location had been found he would consider the cost of labour and then calculate whether the savings offset the possible increase in transport costs. The literature also suggests that labour costs may be an important consideration for airlines. Webber (1984) for example found that "labour costs are becoming the most significant affecting location". This is therefore tested as part of the survey.

Trucking costs between the airport and the main markets: This question is based on Von Thunen's land use theory. Briefly stated the theory says that each parcel of land will be used by the activity that bids the highest price and that the price that a potential user can bid at a given location depends largely on the distance, as expressed by transport or commuting cost, from the central city (Harris and Hopkins, 1972). Converting transportation costs into the current context means to look at the trucking costs between the airport and the main markets and this question tests just how much of a consideration these transportation costs are for freighter operators choosing an airport.

Trucking time between the airport and the main markets: This question seeks to identify how important trucking time is to the freighter operators and whether they consider it in their location decisions. This question was borne out of the literature which suggests that airlines wish to operate as close to the market as possible.
Operating to the airport in a market that minimises flying time: The literature identifies some airports e.g. London Manston that are marketing their airports on a geographic location that minimises flying time on the most typical routes. This question compares just how advantageous reduced flying time would be to airlines with how sensitive they are to trucking time.

The need to locate at a major airport: Freighter operators are being progressively squeezed out of the major airports (as the literature demonstrates) and there are a plethora of secondary airports waiting to welcome them. This question tests just how important operating from a major airport is to the freighter operators.

Question 3

Preliminary interviews with an airport cargo manager conducted during the early stages of this research indicated that freight forwarders were a considerable influence on freighter operators choice of airport. The cargo manager of this particular airport felt that the lack of freight forwarder presence there coupled with a high concentration of freight forwarders at a major airport 100 miles away, was making it difficult to attract cargo airlines. This has also been borne out by the literature suggesting that airports should target the airlines customers (i.e. the forwarders) just as much as the airlines themselves. This is therefore a potentially significant issue and one that requires a great deal of testing, not only in a context of how important is the presence of freight forwarders but also to gain an initial understanding of why that is the case, hence the open ended part b.

Question 4

Part a is a qualifier to part b which only needs to be answered by those airlines that operate passenger aircraft as well as cargo aircraft (combi aircraft are classified as passenger aircraft).
This question is borne from the literature, in particular Hall (2002, p.32) who finds that 'passengers and freight are interdependent in international travel'. There are certain economies of agglomeration to be gained from locating all cargo activities within a region at a single airport. As passenger aircraft may also carry significant amounts of cargo, locating the two together can provide these economies. This question tests exactly how the location of a carrier's passenger services affects their freighter services.

Question 5

This question has come from knowledge of the effects of alliances on the passenger airline industry, where some airlines make way for their partners on certain routes or focus on different airports to feed their partners networks. Given the recent trend for similar cargo alliances such as WOW or Skyteam Cargo and the lack of information on the effects on such alliances in terms of route development, this question is very important to the research, particularly as it also tests further sources of agglomeration economies.

Question 6

There are lots of print advertising campaigns by airports promoting themselves and their facilities as freighter friendly and personal approaches by airports, particularly at trade events are common. Part a tests just how effective these activities are on the airlines decision process.

Part b seeks to reaffirm whether marketing has been effective or not by asking a question based on facts. An indication of whether marketing has actually had an effect on the airline's location decision and importantly how, provides much more information on the subject.

Preliminary discussions with cargo airline managers revealed that the offer of reduced landing charges and similar incentives by airports is a common activity. For example
some airports openly offer a reduced landing charge for services to new destinations or for cargo services operated during daylight hours. This question tests specifically how common this practice is.

**Question 7**

This question again tests findings from the literature and preliminary discussions that indicate that airport user charges are an important consideration for freighter operators when locating their services. There is degree of uncertainty as to the true proportion of the overall costs of a rotation that comprises airport charges and part b therefore seeks to clarify this.

**Question 8**

This question differs from Q2 as it is asking whether the four have actually been influential in the past and to what extent rather than asking whether certain factors would be influential. The reason for testing these factors in such a way is that they are clearly not factors which would be considered on a regular basis and would therefore score lowly on a Q2-type scale. This question is testing how often these have actually been influential. All of the issues come from the literature. The handling agent question also tests for signs of agglomeration.

**Question 9**

This question is primarily testing whether the Hotelling model of location is applicable to freighter operators' location decisions, and particularly whether an airline would choose or avoid an airport based on the decisions of their competitors and how competitors generally affect their location decisions.
Question 10

The restrictive nature of bilateral agreements is highlighted in the literature review chapter, citing examples of agreements restricting the airport services between certain countries can operate to. This question tests how prevalent this phenomenon is.

Question 11

The practice of combining traffic rights for passenger and cargo services is currently an emotive issue in the air cargo industry. This question tests exactly how restrictive cargo carriers have found this practice, and importantly whether they would make any changes to their route network if changes to the practice were made.

Question 12

There is a generally held belief that airports favour passenger operations over cargo operations. An example of this is the literature is the BAAs traffic distribution rules restricting freighter flights into Heathrow and Gatwick. This question canvases the opinion of the airlines and asks how they believe they are receiving lower priority. This can be compared with the airports point of view.

Question 13

In choosing case study subjects one of the key criteria is whether the airline has recently relocated a cargo service. This is so that information can be gained on not only what made them choose the new airport but also what made them leave the old one. Part a is a qualifier question and to test how regular relocations are. Part b informs why the airlines relocated and tests whether it was due to the failing of the old airport or incentives or better facilities from the new one.
Question 14

This question is to gain an indication of the process involved when a cargo airline chooses an airport to serve. The statement presented is an hypothesis based on findings from the literature review that there is a three stage process for an airports selection. This question tests this and asks what the process is if this is not the case.

Question 15

It is important when looking at so many factors to identify which are the most important. This cannot be done accurately any other way from the survey as calculating it from the other closed-ended questions does not cover everything or allow new factors to be included. This also triangulates the findings from the rest of the survey.

Question 16

One of the aims of this research is to evaluate the interaction between airlines and airports. By looking at what airlines want from airport and what they feel could be improved this can be compared with what airports are actually providing.

Question 17

This question is to pick up on anything that might not have been asked in the questionnaire. From using an open-ended format it is hoped to elicit as much information as possible.
Question 18

This question asks whether they would be interested in further participation in the research and is used as a gateway for identifying airlines for the interviews stage of the research.
APPENDIX C
AIRLINE SURVEY COVERING LETTER

<<First Name>> <<Surname>> «State___Province»
<<Position>>
<<Company>>
<<Address1>>
<<Address2>>
<<City>>
<<State>>
<<Post/Zip Code>>
<<Country>>

02 April 2004

Dear <<Title>> <<Surname>>

I am currently undertaking research as part of a PhD at Loughborough University into the airport location decisions of freighter operators. As part of this major research project, supported by The International Air Cargo Association (TIACA), I am conducting a survey of freighter operators. As such I am writing to ask if you, or another member of your company if more appropriate, would kindly complete the questionnaire which accompanies this letter.

The purpose of the study is to contribute to a clearer understanding of the factors that influence freighter operators' choice of airport. I realise that key stakeholders working within the industry can provide a unique and valuable insight into the research area and as such am seeking the views of airlines worldwide that operate freighter aircraft. The focus of the research is the choice of non-hub airports and the questions in the survey relate to this.

I would be very grateful if you could devote a few moments of your time to completing the questionnaire as each response is invaluable to the research. Please answer all the questions which you are able to; if there are some questions you are unable to answer please leave them blank but do not let this stop you from completing the other questions. Please use a new sheet of paper if you feel you need extra space to answer any of the questions. A pre-addressed envelope has been provided for ease of return.

Please be assured that all responses will be treated in the strictest confidence, and the names of respondents will not be associated with responses. A summary of the results will be available on request on completion of the research. If you have any questions or comments about this study, I would be more than happy to answer them. Please contact me by email, telephone or regular mail using the contact information above.

Thank you very much for taking the time to read this letter and I very much look forward to receiving a completed questionnaire.

Yours sincerely

John Gardiner
APPENDIX D

MAIL QUESTIONNAIRE SENT TO A
SAMPLE OF 70 AIRPORTS WORLDWIDE

PAGES 332-337
Q1 (a) How much air cargo (in metric tonnes) did your airport handle last year?

☐ Less than 50,000  ☐ 50,001 - 100,000  ☐ 100,001 - 250,000

☐ 250,001 - 500,000  ☐ 500,001 - 1,000,000  ☐ More than 1,000,000

(b) How is this cargo split between the following types of operation?

Please write in an approximate percentage of overall cargo for each of the following:

<table>
<thead>
<tr>
<th>Cargo Type</th>
<th>%</th>
<th>Cargo Type</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Passenger belly hold</td>
<td></td>
<td>Freighter - Charters</td>
<td></td>
</tr>
<tr>
<td>Freighter - Scheduled non-integrated</td>
<td></td>
<td>Mail</td>
<td></td>
</tr>
<tr>
<td>Freighter - Express / integrator</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Q2 How many airlines currently operate pure freighter services through your airport?

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Q3 (a) How would you describe the mix of cargo and passenger services at your airport?

☐ All cargo  ☐ Predominantly cargo  ☐ Equal split

☐ Predominantly passenger  ☐ All passenger

(b) If your airport handles regular passenger flights, what impacts (both positive and negative) do you feel this has on your cargo operations?

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Q4 How would you describe the overall priority afforded to cargo and passenger services at your airport?

☐ Cargo always favoured  ☐ Cargo often favoured  ☐ Equal priority

☐ Passenger often favoured  ☐ Passenger always favoured

Q5 Which of the following facilities / services are available to freighter operators at your airport?

Tick all that apply

☐ Cargo terminal with airside access
☐ Sufficient ramp space to handle the largest cargo aircraft
☐ Bonded storage facilities
☐ Livestock handling facilities
☐ Perishables handling capabilities
☐ Landside highway access for trucking
☐ Intermodal terminal
☐ 24-hour operations
☐ 24-hour customs services

What is your average clearance time? ________

☐ Office facilities
☐ Aircraft maintenance facilities
☐ Other (please specify) ____________________________

☐ None of the above

Q6 How important do you believe the presence of freight forwarders to be for an airport to attract dedicated cargo services?

☐ Extremely important  ☐ Important  ☐ Neither important nor unimportant

☐ Unimportant  ☐ Not at all important

Q7 Have you taken any specific measures to attract freight forwarders to your airport / region?

☐ Yes (please give details below)  ☐ No (Go to Q8)

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Please turn over ...
Q8 How many freight forwarders are based at, or in the vicinity of your airport?

Write in the number

<table>
<thead>
<tr>
<th>On your airport site</th>
<th>Within 15 km of your airport</th>
</tr>
</thead>
</table>

Q9 How important do you believe the following airport attributes to be in terms of their influence on freighter operators’ location decisions?

Please circle the appropriate number based on the following scale:


<table>
<thead>
<tr>
<th>Quality of road access to the airport</th>
<th>1 2 3 4 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Origin-destination traffic generated by local industries</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>The reputation of the airport for handling freighter flights</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>The overall cost of operating to the airport</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>Customs clearance times</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>Ability to operate aircraft into the airport at night (23:00-06:00)</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>Average delay per aircraft movement</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>Availability of intermodal facilities (e.g. rail interchange)</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>A financial incentive from the airport e.g. reduced landing charges</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>The labour environment (e.g. availability and cost)</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>Trucking time between the airport and the main markets</td>
<td>1 2 3 4 5</td>
</tr>
</tbody>
</table>

Q10 Please indicate which of the following restrictions affecting cargo operations currently apply at your airport?

Tick all that apply

- [ ] Aircraft slot restrictions
- [ ] Capacity constraints
- [ ] Aircraft size restrictions
- [ ] Government-negotiated air service agreements
- [ ] Traffic distribution rules
- [ ] Night curfews
- [ ] Restrictions on noisy aircraft
- [ ] Other restrictions (please specify)
- [ ] None of the above
Q11 (a) Do you feel that official legislation (e.g. air service agreements) have disadvantaged your airport when it comes to attracting cargo services as opposed to other airports in your country or neighbouring countries?

☐ Yes (Answer part b)    ☐ No (Go to Q12)

(b) If you answered yes above, in what ways do you feel disadvantaged?

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Q12 How common is it for you to offer reduced airport charges to cargo airlines in order to attract new services?

☐ Extremely common ☐ Common ☐ Neither common nor uncommon

☐ Uncommon ☐ Never offered such incentives

Q13 How common is it for you to offer development support (e.g. marketing assistance) to cargo airlines in order to attract new services?

☐ Extremely common ☐ Common ☐ Neither common nor uncommon

☐ Uncommon ☐ Never offered such incentives

Q14 Which of the following methods do you typically adopt in an attempt to attract freighter operators to your airport?

Tick all that apply

☐ Print advertising in industry publications

☐ Brochures

☐ Personal approaches to cargo airlines

☐ Attendance at trade shows

☐ Work with freight forwarders

☐ Work with established shippers

☐ Work with local business community to develop demand

☐ Dedicated cargo pages on airport website

☐ Benchmarking other airports

☐ Other (please specify) ________________________________________

☐ None of the above

Please turn over ...
Q15  Does your airport have a marketing plan that focuses on cargo?

☐ Yes  ☐ No

Q16 (a) Has your airport developed facilities or services in order to take advantage of any niche cargo operations?

☐ Yes (Please give details below)  ☐ No (Go to Q17)

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Q16 (b) Has your airport developed facilities or services in order to take advantage of any niche cargo operations?

☐ Yes (Please give details below)  ☐ No (Go to Q17)

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Q17 (a) Has your airport gained any new freighter services in the last 12 months?

☐ Yes (Answer part b)  ☐ No (Go to Q18)

(b) If you answered yes above, what do you believe to be the main reasons for the airline(s) choosing your airport?

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Q18 (a) Has your airport lost any freighter services in the last 12 months?

☐ Yes (Answer part b)  ☐ No (Go to Q19)

(b) If you answered yes above, what do you believe to be the main reasons for the airline(s) leaving your airport?

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Q19  What do you see as the three most important strengths of your airport for attracting dedicated cargo flights?

1 ..........................................................................................................................................................................

2 ..........................................................................................................................................................................

3 ..........................................................................................................................................................................

Please turn over...
Q20 What do you see as the main obstacles to your airport attracting dedicated cargo flights?

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Q21 If you have any further comments regarding your strategies to attract cargo airlines, or any other aspects of this survey, please use the space below or an extra sheet if required.

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Q22 Would you be interested in ...

Please circle yes or no as appropriate:

<table>
<thead>
<tr>
<th>Participating further in this research?</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Receiving a summary of the findings of this research when available?</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

If you answered yes to either of the options above, please write your details in the space provided or attach your business card to enable me to contact you:

Name: 
Job Title: 
Organisation: 
Email: 
Telephone:

Thank you for taking the time to complete this questionnaire. Your responses will be kept confidential. Please return the questionnaire in the envelope provided, or send to:

John Gardiner
Researcher, Transport Studies Group
Department of Civil & Building Engineering
Loughborough University, Leicestershire, LE11 3TU, United Kingdom

If you wish to discuss any of your comments further or want to ask any questions regarding this research, please feel free to contact me by telephone on +44(0)1509 263172 Ext. 4681 or by email J.R.Gardiner@lboro.ac.uk.
APPENDIX E

JUSTIFICATIONS FOR AIRPORT SURVEY QUESTIONS

Question 1

This question was used as a device for categorising respondents according to the significance of their air cargo operations to allow for cross tabulations during the analysis. Part A asks respondents to indicate their overall cargo throughput in 2003 based on one of six categories, allowing the overall scale of the airport to be ascertained. Part b asks for a percentage for each type of cargo to ascertain how significant non-integrated freighter traffic is in terms of the airport’s cargo throughput. A percentage was requested as preliminary discussions with airport cargo personnel revealed many airports do not have exact figures in terms of tonnages for each cargo segment.

Question 2

This question was again for analysis and comparison purposes and is included to gain a further insight into the freighter profile of the airport. Its additional value over question 1 is that it shows the exact scale of the freighter operations at the airport at the time of the survey and not from historical data which question 1 has to rely on. This information also contributed to the interviews in terms of identifying possible airports to participate in this stage of the research.

Question 3

Part a seeks to identify how the passenger operations at the airport compare with the freighter operations in terms of scale which may have implications in terms of the airport’s dedication to cargo services. It is also used for comparison with part b which
tests mixed literature findings regarding the impact of passenger services on freighter operations, particularly whether they are seen as positive for interlining with belly cargo or negative in terms of adding to congestion. The question is however open-ended and therefore does not restrict respondents to those identified in the literature.

**Question 4**

This question seeks to identify from an airport policy perspective where cargo fits in priority wise in order to identify whether this affects other aspects such as cargo throughput and also to gain a snapshot of where the priorities typically lie for a variety of types of airport for the purposes of theory generation.

There was a feeling among some referees who reviewed this survey that this question may not be answered fairly and respondents would always indicate that they give “equal priority” to both passengers and cargo. However as the survey was being sent to cargo managers it was felt from experience that they would answer objectively with regards to their situation even if it suggested their airport was less focused on cargo, and this proved to be the case with “passengers often favoured” being the most common response.

**Question 5**

This question is as a result of literature findings that suggest that certain facilities and services must be present at an airport for it to be a success with freighter operators. By asking respondents to indicate which of the facilities are present at their airport this can be compared with the number of operators at the airport and cargo throughput. Asking for the specific customs clearance time was again a function of the literature which suggested that long customs clearance times dissuaded freighter operators.
Questions 6, 7, and 8

Preliminary interviews with an airport cargo manager conducted during the early stages of this research indicated that freight forwarders were a considerable influence on freighter operators' choice of airport. The cargo manager of this particular airport felt that the lack of freight forwarder presence there coupled with a high concentration of freight forwarders at a major airport 100 miles away, was making it difficult to attract cargo airlines. Questions 6, 7 and 8 therefore seek to test whether this is applicable on a wider scale and whether airports believe freight forwards are the key, as further suggested by the literature which finds that airports should target the airlines' customers (i.e. the forwarders) just as much as the airlines themselves. Question 7 was used as a tool to compare which type of airports are taking measures to attract freight forwarders and to evaluate the different methods used, if any, and to compare any success in this field with success in attracting freighter operators.

Question 9

This question links with question 2 of the airline survey with the factors tested being selected as per the reasons given for that question. This is important to identify whether airports understand what freighter operators find to be important in their airport location decisions. Not all the factors from question 2 of the airline survey are included though with factors such as weather being excluded as they cannot be controlled by the airports.

Question 10

The literature chapter identified a number of potential restrictions that can be inflicted on an airport and that can negatively impact their chances of attracting freighter operators. This question sought to identify the prevalence of these restrictions and also allowed comparisons to be made between the presence of certain restrictions and success attracting freighter operators.
Question 11

Following on from question 10 this question seeks to identify if the airports themselves actually feel like restrictions have impacted upon their ability to attract freighter operators and the reasons for this.

Question 12 & 13

Reduced airport charges and development support were two of the incentives identified from the literature chapter that airports use to attract freighter operators and these questions test how common such incentives are.

Question 14 & 15

These questions focus on the marketing practices of the airport. The marketing methods in question 14 are derived from the literature and personal observation of airport marketing and this question is designed to establish exactly how airports attempt to attract freighter operators. An “other” option is provided to capture any responses not included. During the literature search it was identified that some airports had marketing plans specifically focused on cargo and question 15 sought to identify the prevalence of such plans and to allow for the presence of such plans to be compared with success in attracting airlines.

Question 16

The literature identified that one way for secondary airports to attract freighter operators was to engage in niche services that are perhaps too specialised for most airports to offer thus attracting the airlines that require these services. This question was designed to identify what some of these other niche services are and to identify whether airports are using such potential to their advantage.
Question 17 & 18

Part a of both questions is designed for analysis purposes to compare various policies and services offered with the airport's success or otherwise. Part b is included to identify whether airports realise exactly why airlines are attracted to them or why they decide they no longer wish to operate to the airport; which has important implications with regards to their marketing practices.

Question 19

This question is designed to identify what airports believe to be their greatest strengths for attracting airlines to allow comparisons with what the freighter operators feel they want from an airport. This further highlights any differences in this regard between airlines and airports and provides a basis for making recommendations to airports about how they might better attract non-integrated freighter operators.

Question 20

For the research knowledge of the real problems airports are facing is important in order to better understand the limitations that airports need to overcome to formulate workable recommendations to airports on how they can increase their cargo traffic.

Question 21

This question is to pick up on anything that might not have been asked in the questionnaire. From using an open-ended format it is hoped to elicit as much information as possible.
Question 22

This question asks whether they would be interested in further participation in the research and is used as a gateway for identifying airports for the interviews stage of the research.
APPENDIX F
AIRPORT SURVEY COVERING LETTER

<<First Name>> <<Surname>> <<State_Province>>
<<Position>>
<<Company>>
<<Address1>>
<<Address2>>
<<City>>
<<State>>
<<Post/Zip Code>>
<<Country>>

27 September 2004

Dear <<Title>> <<Surname>>

I am currently undertaking research as part of a PhD at Loughborough University into the airport location decisions of non-integrated freighter operators. As part of this major academic research project I am conducting a survey of TIACA member airports to canvas your opinion on issues relating to the interaction between airports and freighter operators. As I missed you at the Air Cargo Forum I would like to ask for a few moments of your time to complete the attached postal questionnaire.

The purpose of my research, which is supported by TIACA through the Walter H. Johnson scholarship award, is to contribute to a clearer understanding of the factors that influence freighter operators' choice of airport; something I feel will benefit the airport sector.

From this questionnaire I hope to gain an understanding of the issues airports face when searching for new cargo business and the methods adopted to succeed in this increasingly competitive arena. A summary of the results will be available to those completing the questionnaire upon completion of the research.

Please be assured that all responses will be treated in the strictest of confidence and the names of respondents will not be associated with responses. If you have any questions about this study, I would be more than happy to answer them. Please contact me by email, telephone or regular mail using the contact information above. A pre-addressed envelope has been provided for ease of return.

Thank you very much for your time and I look forward to receiving a completed questionnaire.

Regards,

John Gardiner
APPENDIX G

AIRLINE INTERVIEW GUIDE

Initial (open) Question to be posed to all interviewees

What are the most important considerations for your airline when choosing an airport for your scheduled freighter operations?

Further questions / Topic Areas to be Covered

Terms highlighted in bold indicate the general area to be covered aside from the specific question should the question need to be termed differently.

➤ When you are identifying a region to serve, what are the specific considerations that go into your decision?

➤ What impact do industrial clusters have when choosing a region?

➤ With regards to choosing a specific airport, what are the main geographical criteria that the airport must possess?

➤ Can you describe to me the process involved with regards to choosing an airport? What inputs go into the decision and who within your organisation makes these inputs?

➤ How do you assess the level of demand to or from a particular airport? Do you perform any analysis, for example?
How influential is the freight forwarding community when it comes to choosing an airport to operate to?

Can you talk through the interaction between airline and forwarder when it comes to establishing a new route and airport? – If indeed there is any interaction.

When evaluating an airport for a new service, to what extent does the airport chosen by competitors operating in the same markets affect your decision?

How do you view the pros and cons of operating to a secondary, cargo-focused airport compared with a major gateway airport? Is there any particular type of airport your airline prefers and why?

Does a passenger airline presence at an airport have any impact on your location decisions, either positively or negatively?

What about any other stakeholder influences, such as handling agents for example?

What are the specific attributes you look for in an airport when deciding to locate a service?

Obviously minimising costs is important to the airline, but how variable can overall costs be between airports? What are the main cost elements associated with the airport, and how much of a respective influence are these?

Have you ever had any issues with governments or local authorities exerting influence on your location decisions?

How much have you been affected by legislative restrictions limiting the airports you can use?
If a universal open skies agreement could be agreed for cargo, how would this impact on your current freighter network?

How effective do you believe airport marketing to be in terms of attracting new cargo services? Can this influence your decision?

How important are airport incentives such as development support or a charges reduction when evaluating airports?

How could airports improve their marketing pitch to airlines? What do you really want to see airports do to bring in your business?

How much interaction do you have with airports during this process and how would you describe the significance of a good relationship with the airport in terms of making the final decision?
APPENDIX H

AIRPORT INTERVIEW GUIDE

Initial (open) Question to be posed to all interviewees

What are the most important factors that would lead a freighter operator to want to operate to your airport?

Further questions / Topic Areas to be Covered

Terms highlighted in bold indicate the general area to be covered aside from the specific question should the question need to be termed differently.

➢ Could you provide me with a brief overview of the industrial scene in the area i.e. the market for cargo?

➢ To what extent do you analyse this market in order to understand perhaps where a particular airline can be successful, and if this is a strategy you adopt what data and methods do you use to do this?

➢ Are there any competitive advantages or natural advantages that the airport and its location can offer to potential new freighter operators?

➢ In terms of being a successful cargo airport, how important do you view the airport’s proximity in relation to clusters of industry?

➢ Which airports do you see as your main competitors? Do you look at what these airports are doing with regards to cargo in order to benchmark ideas and methods for attracting airlines?
What impacts do the passenger operations at the airport have on freighter operations? Do you think this impacts positively or negatively on cargo airlines’ decisions to come here or not?

How do you think having a number of existing cargo airlines at the airport impacts on your chances of attracting others?

How important is the development of the airport air cargo community as a whole, excluding airlines for a second? Do you make specific efforts to attract freight forwarders or other support services for example?

What role do freight forwarders have in helping you to attract new cargo services? Do you make any efforts to expand the number of freight forwarders at your airport?

What about your relationship with the major shippers? As an airport do you liaise with the local business / industrial community in an effort to better serve their needs?

Is the airport subject to any legislation or restrictions that you feel is constraining efforts to develop cargo at the airport? Or are you even benefiting from any legislation that is maybe constraining competing airports?

Where does cargo slot in priority wise from an organisational point of view and in terms of day to day operations?

How do you compare with competing airports when it comes to the costs to the airline of operating here and how much do you think this matters to freighter operators?

What kind of methods do you employ to try to entice cargo airlines to your airport?
Do you offer any kind of incentives to potential new operators such as a period of reduced charges or marketing support?

What is your opinion on the overall effectiveness of airport marketing in general and how do you feel your airport could improve in this regard?

How much interaction do you typically have with airlines when you are trying to entice them?

How would you describe the significance of a good relationship with the airlines in terms of their final decision on where to operate?

Can you describe the typical stages involved in bringing a new freighter operator to your airport?

How do you see the future for main deck cargo at the airport? What factors do you see driving cargo growth in the future?

To finish, what would you describe as the main ingredients for a successful freighter airport?
Open questions that MUST be posed to interviewee

1. What were the most significant factors that led your airline to choose to operate freighter services to Dallas-Fort Worth Airport?

2. How did DFW Airport first come to your attention as a possible airport to serve?

3. Did you consider any other airports serving the same region as DFW? Why were these eventually discounted?

4. Was the strong presence of other cargo carriers at DFW Airport a consideration in your decision?

5. Did the strong passenger airline presence at the airport have any impact on your location decisions, either positively or negatively?

6. How influential was the freight forwarding community when it came to choosing DFW Airport?

7. How important were the airport user charges and other charges such as handling and fuel in terms of your decision to operate to DFW Airport?

8. Was the airport’s marketing a factor in your decision in any way? If yes can you provide as much detail as possible?

9. How important were airport incentives such as development support in choosing to operate to DFW Airport?
10. Can you describe to me the process involved with regards to choosing DFW Airport? What inputs went into the decision and who within your organisation made these inputs?

Further questions / Topic Areas to be Covered

Terms highlighted in bold indicate the general area to be covered aside from the specific question should the question need to be termed differently.

- How did you assess the level of demand at the airport? Did you perform any analysis, for example?
- What impact did industrial clusters have when choosing the region and airport?
- Can you talk through the interaction between airline and forwarder when it came to establishing the DFW service?
- Were you influenced by any other stakeholders, such as handling agents for example?
- How much interaction did you have with the airport during this process and how would you describe the significance of the relationship between airline and airport in terms of making the final decision?
- When you are next evaluating an airports to serve, what will be the 3 most important aspects you will consider when making your choice?
Open questions that MUST be posed to interviewee

1. What are the most important factors that you feel led China Cargo Airlines to choose to operate to DFW Airport?

2. What role do you believe freight forwarders had in helping you to attract China Cargo Airlines? Do you make any efforts to expand the number of freight forwarders at your airport?

3. What marketing methods did you employ to entice China Cargo Airlines to your airport?

4. Do you offer any kind of incentives to China Cargo Airlines such as a period of reduced charges or marketing support in order to convince them to operate here?

5. How influential do you believe your marketing efforts were in terms of convincing China Cargo Airlines to choose DFW Airport? How do you feel you could your marketing in the future?

6. How much interaction did you have with China Cargo Airlines when you were trying to convince them to operate to DFW? Can you describe this interaction?

7. Can you describe the typical stages involved in bringing China Cargo Airlines to your airport?

8. How would you describe the significance of a good relationship with China Cargo Airlines in terms of their final decision on where to operate to DFW Airport?
Further questions / Topic Areas to be Covered

Terms highlighted in **bold** indicate the general area to be covered aside from the specific question should the question need to be termed differently.

- Could you provide me with a brief overview of the *industrial scene in the area i.e. the market for cargo*?

- To what extent do you analyse this *market in order to understand perhaps where a particular airline can be successful, and if this is a strategy you adopt what data and methods do you use to do this*?

- Are there any *competitive advantages or natural advantages that the airport and its location can offer to potential new freighter operators*?

- In terms of being a successful cargo airport, how important do you view the airport's *proximity in relation to clusters of industry*?

- Which airports do you see as your *main competitors? Do you look at what these airports are doing with regards to cargo in order to benchmark ideas and methods for attracting airlines*?

- What impacts do the *passenger operations at the airport have on freighter operations? Do you think this impacts positively or negatively on cargo airlines' decisions to come here or not*?

- How do you think having a *number of existing cargo airlines at the airport impacts on your chances of attracting others*?

- What about your relationship with the *major shippers? As an airport do you liaise with the local business / industrial community in an effort to better serve their needs*?
➢ Is the airport subject to any legislation or restrictions that you feel is constraining efforts to develop cargo at the airport? Or are you even benefiting from any legislation that is maybe constraining competing airports?

➢ Where does cargo slot in priority wise from an organisational point of view and in terms of day to day operations?

➢ How do you compare with competing airports when it comes to the costs to the airline of operating here and how much do you think this matters to freighter operators?

➢ To finish, what would you describe as the main ingredients for a successful freighter airport?