
FUTURE OF COLOMBO AIRPORT (CMB) AS AN AIRLINE HUB

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ABSTRACT

Aviation throughout the world has seen profound changes within the last two decades. Today more and more airports are looking for hub operations. However, as the success of hub operation would depend on a number of parameters such as geographic location, route network, facilities available, passengers' acceptance etc. not all airports would be able to operate as successful hubs.

This paper investigates the possibility for the Bandaranayake international airport, Colombo, Sri Lanka (CMB) to emerge as a hub airport in the South Asian region. It is found that CMB is situated in a geographically advantageous position in the region with respect to the airline route network. Comparison of travel distances between CMB and prominent O-D pairs and evaluation of airline schedules at relevant established hub airports indicates that CMB could operate as a directional hub serving the South Asian market if the number of destinations with daily flights could be increased.

INTRODUCTION

Fifty years ago, air transport was a very small industry. Air travel was expensive and was restricted to a small segment of the population. However, in 1999, more than 1.5 billion passengers were carried on schedule airline services, equivalent to approximately 25 percent of world population as against an equivalent of 1/2 percent of world population carried on scheduled carriers in 1945. According to the International Civil Aviation Organization (ICAO 2000), the world scheduled airline traffic would increase at an average annual rate of over 5 percent by the year 2002.

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Asia/Pacific region is expected to grow at the highest rate among ICAO regions.

During the periods where governments exercised tight control and regulations, authorities had to find means of financing large scale investments required for the production of new aircraft and modernization of old fleets due to the growing demand for air travel, improved safety regulations and pressure for highest environmental controls. This resulted in the deregulation in airline industry in U.S. in late 1970s. The next wave of activities that followed the deregulation were part or total privatization of airlines and airports implementing open-sky policies to allow market forces to determine the destiny of the national carriers and the aviation industry.

Another development, which took place around the same time, especially in U.S., is the consolidation of few airports as collection centers for passengers and cargo. These types of airline route networks have become increasingly popular around the globe due to the economies derived by the airlines and airport authorities (Jemiolo & Oster, 1987). Airports that act as collection centers have benefited by the increased number of aircraft and passenger movements. Airlines that operated such schedules have benefited by dominating their presence at one location thereby creating an effective monopoly and deriving economy of scales by operating large aircraft. This phenomenon is called hub operation.

The objective of this paper is to investigate the viability of hub operation in the future at the Bandaranayake International Airport (CMB), Colombo, Sri Lanka which is located just South of India approximately 7° N and 80° E (Figure 1). CMB is just 20 km from the capital city Colombo and is the only International airport serving the Island's 19 million population.

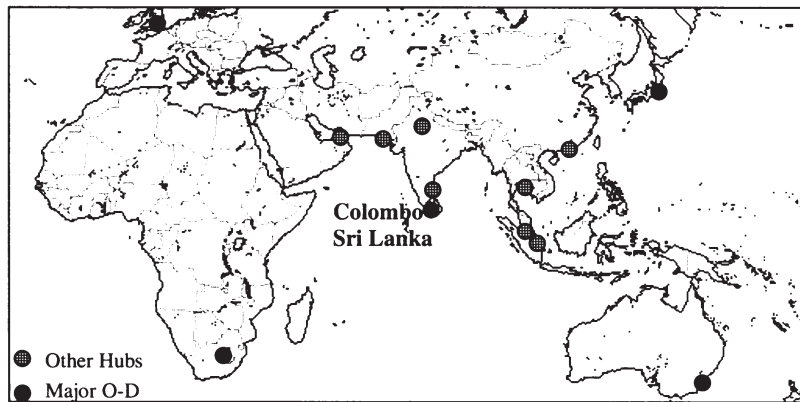


Figure 1. Location Map

Sri Lankan (formally Air Lanka) airline is the national flag carrier in Sri Lanka, which is based at CMB. At present Sri Lankan airline is a partner of Emirates Airlines and also managed by Emirates officials.

PROBLEM IDENTIFICATION

Airports world over make huge investments on capacity improvement and facility upgrading to meet the growth forecasts in passenger and cargo movements. International Civil Aviation Organization (ICAO) and other leading aircraft manufacturers predict the highest growth indices to emerge in Asia (ICAO 1995, 2000).

The hub concept is a phenomenon that can be considered on the rise in the air transportation system outside U.S. In a hub airport, a network of inbound and out bound flights are conveniently scheduled for efficient connections without having the need to have direct flights to several destinations from all regional airports.

In this backdrop, the need to upgrade the air transportation system in Sri Lanka seems appropriate. However, knowing the limited population of the country and its leverage on future capacity requirements at CMB, the need to evaluate other possibilities to benefit from the expected growth is in order. Management decisions on future strategic direction influences the infrastructure facilities and their capacities in the future airport. Due to the nature of the industry and the presence of different stake holders with varying influences on operations at an airport, such corporate decisions should be based on careful analysis of viability and its implications on all stake holders; airport, airlines, passengers, local community and the government.

HUBBING AND ITS IMPLICATIONS

A hub is an airport used by an airline or airlines, passenger and cargo, as a coordinated point, with several flights arriving in a short time period from several origins, allowing time for connections, and departing in a short time period to several destinations. Hub operations expanded mainly because of the carrier's need to derive economies of scale by operating larger aircraft and the need to monopolize its presence at one airport by offering higher schedule frequencies (Rubin and Jeng, 1993).

Hubs provide passengers with the preferred time of day slot for travel with increased schedule frequency, which eventually reduce the schedule delay time. Schedule convenience, is the prime reason for most passengers to choose between airlines. Airlines in exploiting economy of scale at the hub airport, offer passengers the convenience of flying in larger more

efficient aircraft in more comfort (Kanafani & Ghobrial, 1985). Another convenience for the passengers looking for one stop shopping is the ability to find most of the preferred destinations within the network of one carrier which eventually helps to keep the transaction cost to a minimum (Dempsey & Gesell, 1997). Ghobrial (1991) showed that increased emphasis on hubbing alone would not guarantee airline profitability unless it is associated with airline dominance at the main hub used for its operations.

Airport authorities have benefited from the increased traffic at the hub airport and its potential to reduce dependency on aeronautical revenue as the main source of income. In Asia, this trend will continue for some time due to the growing demand for duty-free shopping. But with the increased emphasis on reducing the turnaround time at hub airports, the future of commercial revenue expected of franchises, rentals, concessionaires may not be lucrative. Kanafani & Ghobrial (1985) in studying implications of hubbing on airport economics, revealed the negative impacts of congestion at hubs and a potential trend to impose hub penalties such as increasing the fare and raising breakeven load factors to secure adequate returns on increased investments required to support hub operations. They have also given increased congestion as a reason for major hubs to lose attractiveness and as an opportunity for new hubs to emerge.

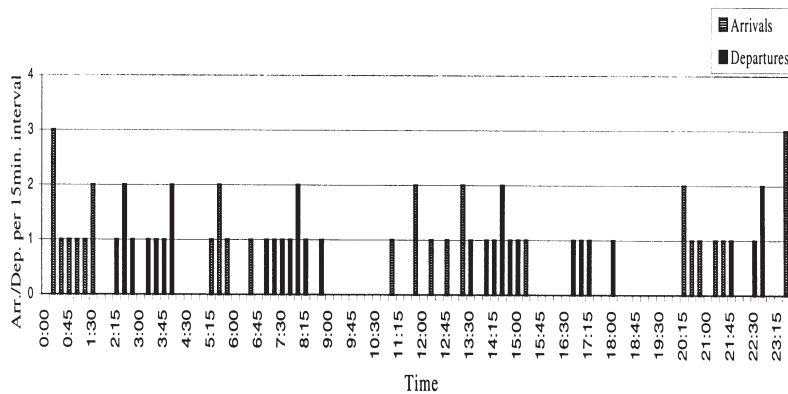
METHODOLOGY

The geographic location of Colombo with respect to the possible catchment area and the established hub airports in the region was studied based on route lengths between prominent origin-destination pairs. Airline schedules at established hub airports in the region (Singapore, Changi [SIN] and Dubai [DXB]) and well established European hub airports that have direct connections to the study region (London, Heathrow [LHR] and Amsterdam, Schipol [AMS]) were analyzed in detail to identify characteristics of schedules of major carriers at their respective hubs. These were then compared with the present schedule at Colombo (CMB). Data collected from a questionnaire survey carried out among frequent airport users were used to identify the passenger preferences at a hub airport and their attitude towards the facilities available at CMB. Passengers who have flown at least 3 times during an 18-month period were interviewed with the help of airline ticket agents.

SCENARIO TODAY

Aircraft sizes changed over the years and will continue to grow as long as it can bring economy of scale to all stakeholders in air transportation.

With the present trend to develop mega carriers, the need to have collection centers to consolidate and collect passengers will continue. The degree of concentration of airline’s operations at a particular airport will be the primary indication of hubbing. Any flag carrier will enjoy this status by concentrating its operations at the country’s international airport and contribute the primary element in creating a hub. Analysis of airline schedules at the selected airports clearly shows the basic premise at hub airports arrivals feed departures. For example, Emirates Airlines’ movements at the Dubai international airport on a Saturday shows how the departures are scheduled after a set of arrivals (Figure 2). Emirates offers schedule convenience by limiting the connection time to a maximum of 3 to 4 hours as evident from the hub duration.

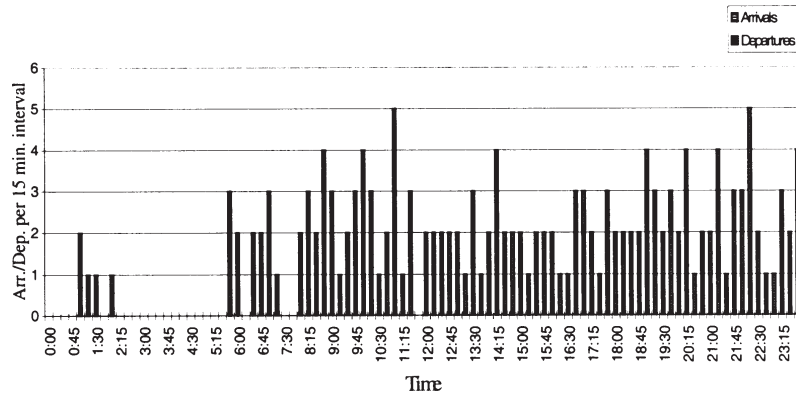


Source: Emirates Airlines Timetable, June/October 1998

Figure 2. Emirates—Movements in Dubai on a Saturday

When several airlines present at a hub, airlines prefer the prime slot with many flights to collect more connecting passengers. This eventually results in severe peaking of facilities and services, which airport authorities would like to spread over the entire period. Figure 3 indicates an attempt to spread the demand while maintaining a hub schedule pattern at Singapore Changi airport. A similar pattern can be observed on all seven days of the week.

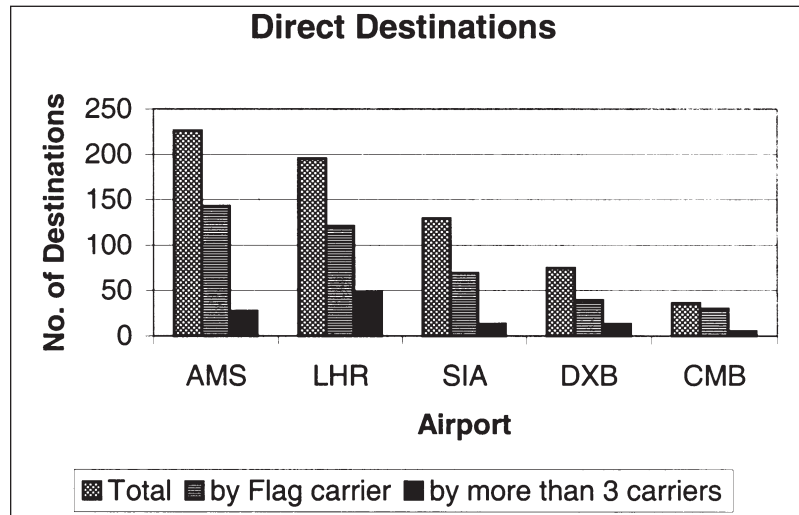
Analysis of published schedules (Official airline guide) at few major European, Middle East and Asian hub airports indicate a relatively higher number of direct destinations offered as compared to less hub networks. These schedules also show the presence of one strong carrier sharing the lion’s share of these destinations, which in this case was the country’s flag carrier. Another factor that indicates successful hubbing is the degree of schedule convenience. One measurement of this could be the ratio between the number of destinations with daily frequency to the total number of



Source: Singapore Airlines Flight Schedule, October 1998.

Figure 3. Singapore Airline Aircraft Movements at Changi Airport on a Sunday

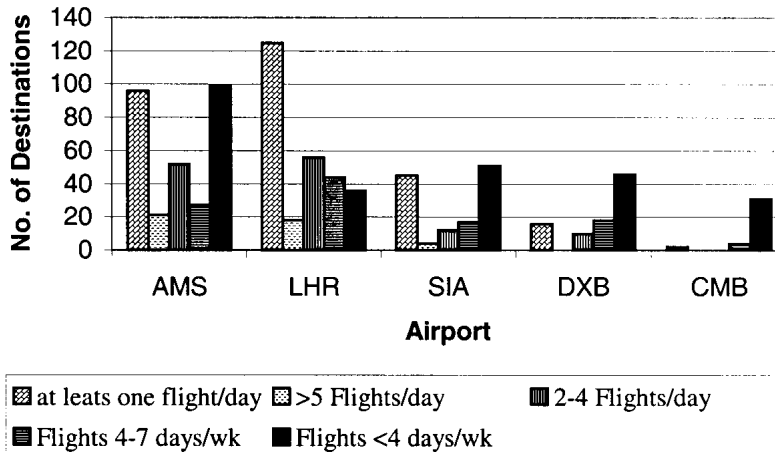
direct destinations offered at the airport. Another indicator of schedule convenience is the share of destinations that offer a choice of carriers (more than three different carriers) out of the total number of destinations offered at the hub airport. Comparison of airline flight operations between destinations with direct flights and flight frequencies at the above selected airports are given in Figures 4 and 5, respectively.



Source: Official Airline Guide 1997

Figure 4. Flight Operations at Selected Hub Airports

Flight frequency

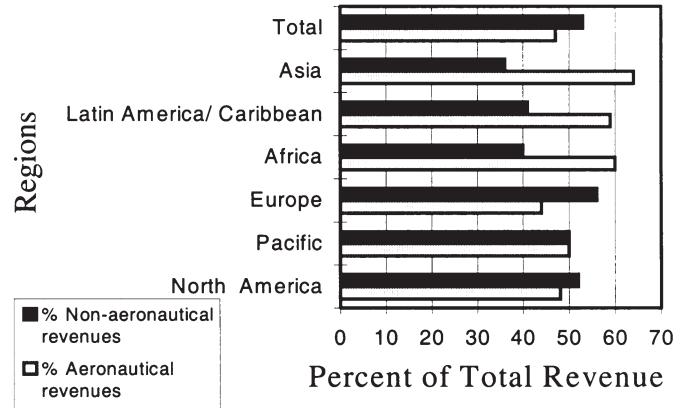


Source: Official Airline Guide 1997

Figure 5. Flight Frequencies at Selected Hub Airports

It can be seen that the National carrier dominates schedules at the CMB, which operates to 30 destinations out of the 36 direct destinations offered. However, at present only 2 of the 36 destinations offered through CMB have daily flights. At Schipol (AMS) and Heathrow (LHR), nearly 50 percent of the destinations have daily flights. Close to 10 percent of the total direct destinations offered have more than 5 flights per day by one single carrier and approximately 10 percent and 15 percent of the total destinations are served with three to four different carriers respectively.

Revenue to an airport mainly consists of the aeronautical revenue and the commercial revenue. Landing, parking and over flying charges for aircraft are considered as aeronautical revenue of an airport. Commercial revenue constitutes the moneys received from duty-free, concessionaires, rental, fuel throughput, airport tax and vehicle parking. With the development of air transportation and increased emphasis on hubbing, the historic view of the primary source of airport revenue is changing from aeronautical to commercial. While hubbing tends to increase the passenger enplanement at the airport, the best way to gain the full benefit of this trend should be evaluated, for an inter-regional and intra-regional passenger. Figure 6 shows the distribution of total revenue among aeronautical and non-aeronautical (commercial) sources in each region. It can be seen that the potential to increase the non-aeronautical revenue in the Asian region.



Source: Air Transport World (1997)

Figure 6. Airport Revenue as per Region

COUNTRY'S VIABILITY TO EMERGE AS A HUB

The survey on passenger preferences in selecting a transfer airport was done to identify what attributes passengers do expect from a hub airport and on what grounds they are willing to change their transit airport choice. Since this was done with a predominantly local market there is little relevance to the viability of hub operations. According to the responses from passengers who have flown at least 3 times during a 18 months period, majority preferred a direct route in spite of any offers attached to other options via a hub airport. If several offers were available to a passenger to encourage travel through a hub, the priority order of selecting a particular route is as follows; i) cheaper fare than flying direct, ii) reliable schedules at the hub airport and iii) one night stay free of charge.

In selecting a transfer airport out of several equal cost options, lowest transit waiting time appeared to be the first choice. With respect to terminal attributes of a hub airport, quick and convenient check-in facilities, user-friendly passenger guidance, clean and tidy buildings and reliable baggage handling system have been identified as the top requirements of a good transfer facility.

Runway and Taxiway facilities at CMB have the capacity to handle the expected aircraft movements for next 15–20 years. There is no restrictions and night curfew. Hardly any situations where the runway had been closed due to bad weather. The passenger movements at CMB have increased from 0.15 million in 1972 to 2.65 million in 1999. During the last 10 years the CMB has recorded annual growths of 10 percent, 6 percent and 13.5

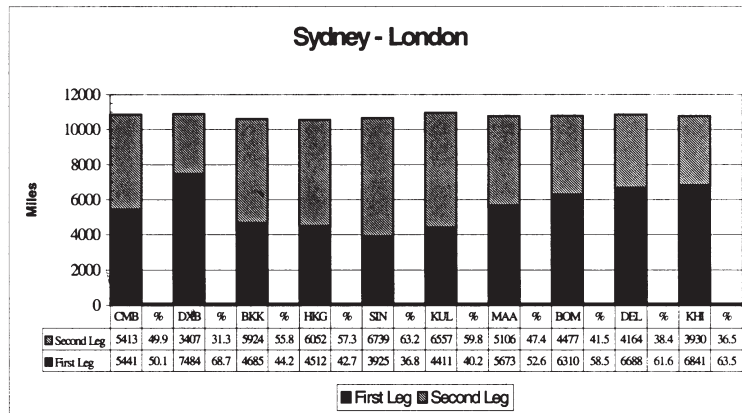
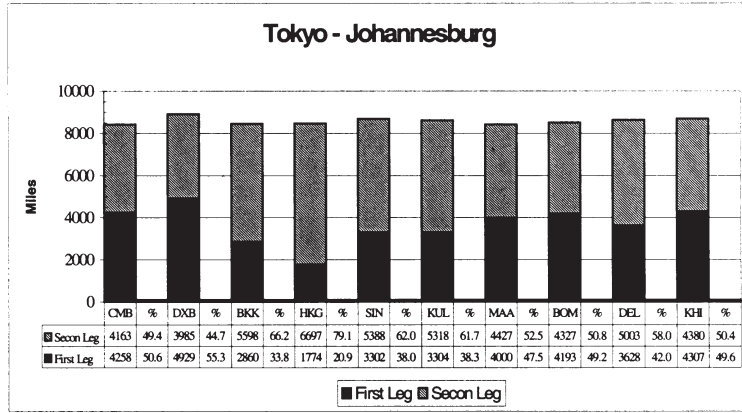
percent of passenger, aircraft and cargo movements respectively. CMB has already started the development of its terminal building and the air navigation system with the help of external funding (AASL, 1997).

Despite the terrorist activities in the northern part of the island Sri Lanka has shown a healthy and steady increase in country's economy. This is evident from the average annual increase of 5–6 percent in Sri Lanka's GDP during the last 7 years and steady increase in per capita income (Central Bank, 1999). The above shows that CMB has a potential to grow and will be able to accommodate any increase in aircraft traffic in the near future.

The primary characteristic of a hub airport can be considered as its geographical location that allows flights from several directions. According to Dempsey & Gesell (1997), the main direction for business traffic is from East to West. Accordingly, the biggest comparative advantage Sri Lanka has over the other established hubs in the region in terms of its potential to develop and sustain hub operations is its geographic position in the cross roads between N-E to S-W and S-E to N-W traffic. The approximate travel distance between prominent O-D pairs through established and potential hubs in the region shows that CMB is located closer to the direct route between the O-D's, specially with respect to N-E to S-W traffic (Table 1 and Figure 7).

Table 1. Distances between Selected Hub Airports

| <i>Hub Airport Selected</i> | | <i>Distance (Miles)</i> | | | | | |
|-----------------------------|------------|---------------------------|----------------|--------------|----------------------|----------------|--------------|
| | | <i>Tokyo-Johannesburg</i> | | | <i>Sydney-London</i> | | |
| | | <i>1st Leg</i> | <i>2nd Leg</i> | <i>Total</i> | <i>1st Leg</i> | <i>2nd Leg</i> | <i>Total</i> |
| Dubai | DXB | 4929 | 3985 | 8914 | 7484 | 3407 | 10891 |
| Bangkok | BKK | 2860 | 5598 | 8458 | 4685 | 5924 | 10609 |
| Hong Kong | HKG | 1774 | 6697 | 8471 | 4512 | 6052 | 10564 |
| Singapore | SIN | 3302 | 5388 | 8690 | 3925 | 6739 | 10664 |
| Kuala Lumpur | KUL | 3304 | 5318 | 8622 | 4411 | 6557 | 10968 |
| Madras | MAA | 4000 | 4427 | 8427 | 5673 | 5106 | 10779 |
| Bombay | BOM | 4193 | 4327 | 8520 | 6310 | 4477 | 10787 |
| Delhi | DEL | 3628 | 5003 | 8631 | 6688 | 4164 | 10852 |
| Karachi | KHI | 4307 | 4380 | 8687 | 6841 | 3930 | 10771 |
| Colombo | CMB | 4258 | 4163 | 8421 | 5441 | 5413 | 10854 |
| Direct | | | | 8420 | | | 10562 |



Source: <http://www.indo.com/distance/>

Figure 7. Distances through Selected Hub Airports

It can also be shown that Colombo (CMB) and Madras, India (IXM) more centrally located as a secondary hub in the region with respect to the airports selected in the Asian region (Table 2). There is the possibility of Madras (MAA) developing its airports to benefit from their geographical position. However, the very strong local market in India and the present marginal level of international traffic originating from MAA, it will not be necessary for the authority in India seriously look to exploit hubbing at MAA in the near future.

Table 2. Route Lengths between Selected Airports

| <i>From</i> | <i>Distance (miles)</i> | | | | | | | | | |
|-------------|-------------------------|------------|------------|------------|-------------|------------|------------|------------|------------|------------|
| | <i>DXB</i> | <i>BKK</i> | <i>HKG</i> | <i>SIA</i> | <i>KLIA</i> | <i>CMB</i> | <i>IXM</i> | <i>MUM</i> | <i>DEL</i> | <i>KHI</i> |
| DXB | | 3026 | 757 | 3615 | 3431 | 2048 | 1821 | 1196 | 1363 | 735 |
| BKK | 3026 | | 1099 | 885 | 740 | 1479 | 1367 | 1867 | 1816 | 2298 |
| HKG | 3757 | 1099 | | 1593 | 1561 | 2555 | 2371 | 2734 | 2404 | 3033 |
| SIA | 3615 | 885 | 1593 | | 187 | 1619 | 1801 | 2419 | 2578 | 2930 |
| KLIA | 3431 | 740 | 1561 | 187 | | 1527 | 1620 | 2235 | 2394 | 2744 |
| CMB | 2048 | 1479 | 2555 | 1619 | 1527 | | 415 | 951 | 1518 | 1493 |
| IXM | 1821 | 1367 | 2371 | 1801 | 1620 | 415 | | 638 | 1110 | 1180 |
| DEL | 1363 | 1816 | 2404 | 2578 | 2394 | 1518 | 1110 | 737 | | 679 |
| KHI | 735 | 2298 | 3033 | 2930 | 2744 | 1493 | 1180 | 547 | 679 | |

From the viewpoint of passenger convenience, this positioning offers another remarkable advantage that most airline passengers prefer. This is the central location of the country. Most passengers flying in excess of 14-15 hours prefer a stop halfway to break the journey than to fly for 3 to 4 hours and then to set in for a journey in excess of 12 to 13 hours (Hill, 1999). Figure 7 shows how Colombo is centrally positioned with respect to other regional airports for traffic from N-E to S-W and S-E to N-W.

CONCLUSIONS

The geographic position of Colombo in the crossroads between N-E (Japan, Korea) to S-W (South Africa) and S-E (Australia) to N-W (Europe) is the most favorable comparative advantage it has for viable hub operations. Other factors include the availability of a strong home based carrier with a well connected network of destinations, a huge catchment area in South India and in the South Asian region, and year-round favorable weather conditions. However, for Colombo to develop as a secondary hub in the South Asian region, it is necessary to have an increase in flight frequencies. The number of destinations with daily direct flight should be increased to maintain viable load factors and to provide attractive schedule frequencies.

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