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Airport route development and its role in developing traffic connections and services: Case Mumbai – Helsinki route

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The commissioner of this study is Finavia, the state-owned airport managing body in Finland. There are over 179 direct routes from Finavia's airports where 162 non-stop destinations are from Helsinki airport (HEL). The objective of this study is to define and analyze demand, feasibility and viability of the route between Mumbai (BOM) and HEL. Thus, this study aims to clarify factors affecting this particular route.

Simply, air route development is a process aiming at expansion, maintaining existing air services and drawing new air services with new air carriers. This process contains the following steps: setting objectives, market analysis, business case development and initiating the route through stakeholder engagement processes.

This study has been implemented using case study method, where quantitative and qualitative approaches in data collection and analysis are used. The data of the number of both direct and indirect passengers were collected from Sabre Global Demand Data and Center for Aviation CAPA from 2014 to 2019. Power BI and Excel Pivot tools were used for analyzing the data.

This case study has been conducted prior to the COVID-19 pandemic therefore it can be interpreted in an optimistic way. Although this route would connect Mumbai region with Scandinavian and European destinations in shorter travelling times but based on feasibility analysis this route would not be a profit-making route. Passenger numbers and other assumed measures are based on historical data and published reliable sources. Based on these parameters, this route would be making 34.4 million euros in revenue still leading to a negative operating profit of 302,000€ and an operating margin of -1%.

Keywords

Airport route development, Demand, Feasibility analysis, Connectivity

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1. Introduction

Airports are a vital component of the transport system where it has a very important role in developing traffic connections and services. Airports are facilitating the safe movement of nearly 3.6 billion travelers, 35 million flights and 50 million tons of valued air cargo annually. (Halpern & Graham 2018, 48.)

The commissioner of this study is Finavia, the state-owned airport managing body in Finland, where it is trying to connect Finland with the rest of the world leveraging shortest travel times between Asia and Finland. There are over 179 direct routes from Finavia's airports where 162 non-stop destinations are from Helsinki airport (HEL). There are 30 long-haul routes from HEL of which 22 long-haul routes are headed to Asian destinations. With 4.9% of passenger growth compared to 2018, approximately 22 million travelers passed through HEL of which 87% travelled to international destinations in 2019. (Finavia Pricing and Analytics Manager 13.12.2019.)

The objective of this study is to define and analyze demand, feasibility and viability of the route between Mumbai (BOM) and HEL. Thus, this study aims to clarify factors affecting this particular route. Furthermore, the following sub-questions were made for consideration to help determine the study problem:

- What are the strengths of Finavia? What is the role and impact of macroenvironmental factors of Finland on Finavia? Macroenvironmental factors refer to political, economic, socio-cultural, and technological factors of the operating environment.
- What are the demands for the Finnish and Indian markets? Demand refers to travelers' willingness to travel between two points and to pay a certain amount for the service.
- What factors affect the demand and eventually viability and feasibility of the air service?

This study has been implemented using case study method, where quantitative and qualitative approaches in data collection and analysis are used. As the primary research approach, quantitative method provided valid quantified information about the passengers travelling between Finland and India. The data of the number of both direct and indirect passengers were collected from Sabre Global Demand Data and Center for Aviation CAPA from 2014 to 2019. Power BI and Excel Pivot tools were used for analyzing the data. To support the result of quantitative research, interview as a qualitative method was used and four aviation professionals were interviewed on both ends of HEL and BOM. Two of the interviews were conducted via email and the other in person. The questions for interviews are listed on Appendices 2 and 3.

The theoretical part of this study describes the airport business environment in order to provide the reader with an understanding of the airport business and the importance of route development for the viability of the whole airport system. Furthermore, the author of this paper aims to provide a comprehensive description of route development from the airport point of view and factors affecting demand, feasibility and viability of a route. Due to the nature of the topic and complexity of it, slight overlaps between chapters are possible.

This study has six chapters followed by references and the appendices. Chapter one is about the introduction into the study followed by the introduction to the airport business framework and ecosystem while airport business environment, airport profitability and the industry outlook are explained in Chapter Two. The commissioner of this study is introduced in the Second chapter as well.

The Third chapter focuses on providing comprehensive and significant information regarding route development from the airport perspective. Furthermore, perception differences between airports and airlines on route development, the role of demand and factors affecting it are discussed. The empirical part of this study along with the research process are presented in the Forth chapter.

Chapter Five presents the results of this study and route between BOM and HEL where Chapter Six presents the conclusion and discussion. This is followed by references and appendices.

2. Airport Business Framework

This section includes a short overview of airport business framework. The components of the airport business framework are analyzed in the context of airport business environment, airport profitability and air transport industry long-term outlook. Furthermore, the commissioner of this study is presented, and Helsinki airport's growth and development are highlighted.

2.1. Airport Business Environment

Airports are a vital element of the air transport system gathering a vast number of commercial and non-commercial services in order to fulfil their role. Services provided by businesses at the airport have a huge impact on the airport's relationships with its customers, economic and operational performance. In addition to this, airports have a significant strategic role to the nation and region they serve. Within European Union (EU), deregulation became operational in three stages which had a significant impact on the airports and their operations compelling them to act more in a commercial enterprise manner and business-like management. (Graham 2018, 1-6.)

The rise of deregulation and liberalization of air transport markets resulted in a creation and development of new airline business models such as low-cost carriers (LCCs), alliances and joint ventures offering airports with totally new business opportunities. However, the willingness of airlines, especially LCCs, to move from an airport to another creates more traffic volatility, uncertainty, and threats for them. For airports with only a handful of airline customers, this new era is a huge concern pushing airports to pursue different and both generic and growth strategies such as cost leadership, differentiation, and focus (niche). (Halpern & Graham 2018, 155-156.)

Deregulation enabled airlines to be able to maneuver where they fly to and from allowing airports to attract new route opportunities through marketing. With several ways to assess the marketing environment, it has been divided between micro- and macroenvironments. Microenvironment factors are those that are close to the company which have direct impact on the ability of the company to serve its customers. On the contrary, macroenvironment contains elements of political, economic, socio-cultural, technological, environmental, and legal (PESTEL) influencing an organization and its operations in a specific market. (Halpern & Graham 2013, 2 &13-14.)

Airports are unique each having a different kind of markets. Airlines, passengers, non-traveler, service providers and development partners are classified as customers of airports. Based on customers' behavior and various variables such as business model, markets served, alliances use, purpose of trip and destination airlines and passengers are segmented. The nature and purpose of the trip can be business, leisure or visiting friends and relatives (VFR). Segmentation will enhance the development of commercial services of the airport as well. (Halpern & Graham 2013, 45-62.)

Marketing of new air services is one of the fundamental aspects of airport marketing research. For this, Air Service Development (ASD) process or route development will be conducted. Usually the ASD process includes: identifying catchment area, assessing the market and leakage analysis, identifying unserved/underserved routes, generating growth forecast for potential routes, assessing the financial viability of the route followed by presentation and implementation of the route. Each stage has different data and research requirements aiming at identifying potentially profit-making routes that are not served currently. (Halpern & Graham 2013, 63- 70.) These items will be explained in detail later in this research.

2.2. Airport Profitability

Over the past century, several airports with high number of passengers which are not only acting like mega-hubs of world's air travel but have developed from a simple aeronautical activity aspect into significant commercial organizations driving development of social opportunities, cultural exchanges and national economic growth desired by States. Over 3900 commercial airports situated in regions with either huge populations, mature and/or rapidly growing economies are facilitating the safe movements of over 34 million commercial flights annually. (Halpern & Graham 2018, 49.)

A report published by International Civil Aviation Organization (ICAO) (2019a, 8-9), indicates the whole worth of aviation industry is $2.7 trillion and it is forecasted to rise to $5.7 trillion by 2036. For the same year, Airports Council International (ACI) reported that airport industry revenue surpassed $172.2 billion of which 55.8% accounts for aeronautical charges, nearly 40% for non-aeronautical sources and 4.3% for non-operating revenues. The same report indicating a global return on invested capital (ROIC) of 7.4% and airport industry net profit margin of over 20% which decreased slightly compared to 2018. (ACI 2019a.)

Despite high profit margins of airports, the year-on-year (YoY) growth of global airport industry between 2014 and 2015 was only 8.2%, and many airports operated at net loss. According to an analysis mentioned in the book, it indicates that geographical situation, the number of passengers, size of the airport and regulatory environment tend to have significant influence on the profitability of the airport, compelling them to develop and generate other possible revenue streams as they are unable in covering operation costs from aeronautical revenues alone. Without non-aeronautical charges a large number of airports would not be viable nor profitable. (Halpern & Graham 2018, 56-57.)

2.3. Air Transport Industry Long-Term Outlook

Aviation industry after facing many changes and challenges over the past three decades, is operating in a global and cyclical environment generating huge benefits for us all. Factors such as other alternative sources for fuel, cybersecurity, environmental issues, geopolitical instability, oil price, and the volatile nature of world economy are presenting greater impact and uncertainty than average on aviation industry. (IATA 2018a, 5-10.) Over a 25% of world's inhabitants with over a 25% of world Gross Domestic Product (GDP) are located in Aviation Mega-Cities (AMC). AMCs are cities with a high level of connectivity and international passengers. Despite the changes faced the traffic has doubled every 15 years, and it is forecasted to do so in the coming 15 years. Over next 20 years, the demand for new aircrafts will be over 39000 from which the share of Asia-Pacific will be over 40%. (Airbus 2019a, 3-9.)

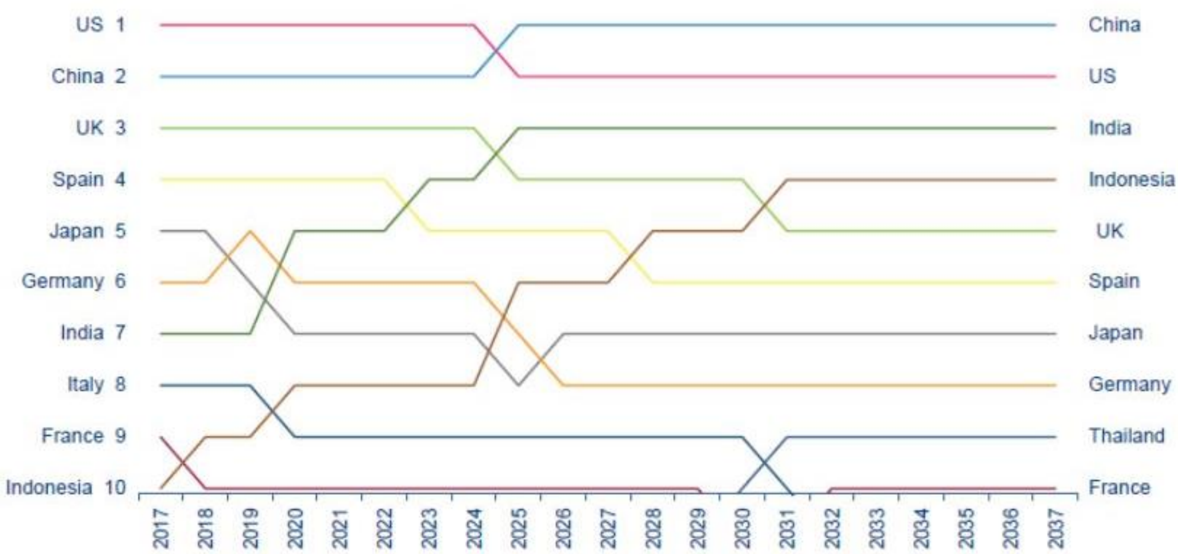
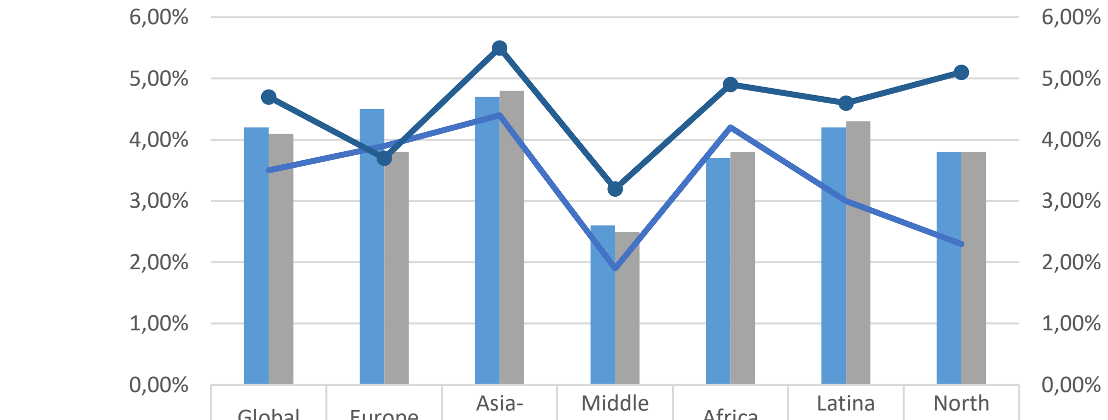


Figure 1. Changes in market powers (IATA 2018b.)

The International Air Transport Association (IATA) is foreseeing over 8 billion air travelers by 2037 with a compound annual growth rate (CAGR) of 3.5%. The Asia-Pacific region will be the center of the growth driven by mixed of factors such as growth and developments in economic, household income, population and demographic characteristics. Figure 1 above demonstrates the biggest (top 10) air passenger market powers and how they evolve over time based on the number of passengers to, from and within a country. The United States will be taken over by China making it globally largest aviation market by 2037. China's market power is supported by its strong economic growth allowing inhabitants to strengthen tourism expenditure. Based on IATA's forecasting, after China and United States, India, Indonesia and United Kingdom will take places of third, fourth and fifth, respectively. (IATA 2018b.)

Table 1. Air traffic demand and capacity growth for different regions (IATA 2019.)



	Global	Europe	Asia-Pacific	Middle East	Africa	Latina America	North America
2019 Demand	4,20%	4,50%	4,70%	2,60%	3,70%	4,20%	3,80%
2020 Demand	4,10%	3,80%	4,80%	2,50%	3,80%	4,30%	3,80%
2019 Capacity	3,50%	3,90%	4,40%	1,90%	4,20%	3%	2,30%
2020 Capacity	4,70%	3,70%	5,50%	3,20%	4,90%	4,60%	5,10%

Factors such as high passenger numbers supported by emerging markets, and oil price had favorable effect for airlines allowing them to generate operating profits of almost $270 billion since 2015. World's economy growth has been quite slow and average global GDP growth rate has been 2.8% in 2019 and 2.7% has been forecasted for 2020. (Airbus 2019, 15-20.) According to IATA, aviation industry's profitability and world's economy are predicted to revive and stabilize as geopolitical risks and other issues are expected to settle. Fuel costs are forecasted to remain relatively at the same level as before, and passenger demand to increase at the average rate of 4.1% in 2020. Table 1 above illustrates how the passenger demand and capacity has been growing and forecasted in different regions of the world in 2020 in comparison to 2019. Estimations of this table are prior to the COVID-19 virus pandemic and may not reflect current situation anymore. (IATA 2019.)

As the demand for air travel increases the networks are evolving as well. In recent years, the number of new routes opened have been increased with main focus on short-haul markets within intra-China and Europe regions. The large numbers of routes expected to be opened between AMCs and the volume of the passengers represented by emerging markets are expected to be over 40% over the next two decades displacing advanced markets. (Airbus 2019, 34-37.)

2.4. Finavia

Finavia, a Finnish airport operator, is a public limited company fully owned by the Finnish state aiming to connect Finland with the rest of world. Finavia enables international connections through its 21 national airports network - particularly Helsinki Airport as the main airport. In 2019, total revenue of Finavia was over 389€ million and Helsinki airport revenue increased by nearly 6% to 274€ million compared to 2018. (Finavia 2019a, 2 & 16.) There is a total of 179 direct routes from Finavia's airports with 26 million passengers (PAX) passing through these airports which increased by 4.2% compared to 2018. Out of 26 million passengers, 87% accounted for international (INT) and 13% for domestic (DOM) travelers. (Finavia 2019b, 5 & 21.)

HEL, as a primary airport in Finland and important European hub, has a crucial position in Finavia's strategy seeking continuously to strengthen its position in passenger traffic between Europe and Asia enabled by Finland's distinctive geographical location. (Finavia 2017, 15.) In 2018, over 20 million passengers passed through HEL and international passenger volume increased by 23%, especially among India, Middle East and America. European countries (EU and non-EU), Asia and Middle East holding the main shares of international traffic at HEL. In the same year, the share of EU countries was 69%, Asia 14.6%, the rest of Europe 11.5%, Middle East 2.1%, North America 1.9% and the rest of the world was 0.6%. The growth of international passenger traffic at HEL was faster than at any other airport both in Nordic countries and Europe except for London Heathrow (LHR). (Finavia 2018, 18.)

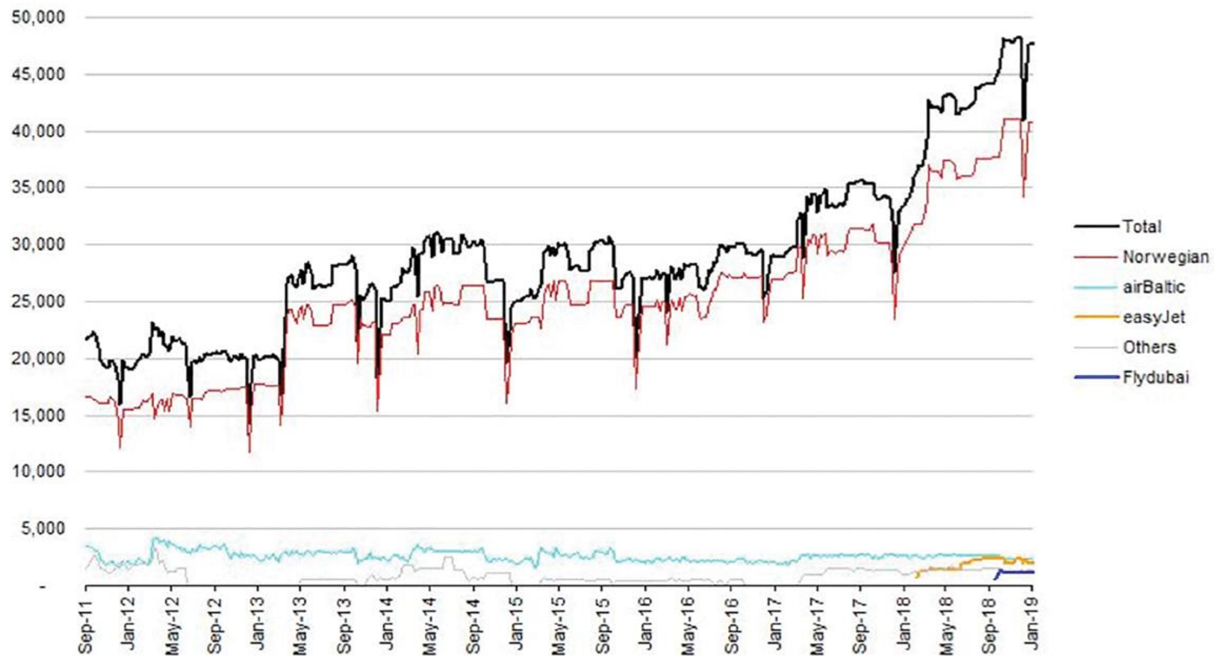


Figure 2. Seat-capacity development of LCCs at the HEL between Sep/11 – Jan/18 (CAPA 2018.)

Helsinki's huge traffic growth is supported by Asia-concentrated long-haul strategy and two-way tourist traffic between Europe and Finland mainly driven by Finnair with almost 70% of seat share and Norwegian with more than 13% of seat share in 2018. At the same year, seat share of LCCs stood for more than 15% involving AirBaltic and EasyJet with largest shares after Norwegian. Figure 2 above demonstrates the development of LCCs at HEL and after relatively flat capacity development from 2011 to 2016, the growth has been strong. By September of 2018, after major European hubs, HEL is the 7th largest airport in terms of seat share to Asia Pacific and 6th to Northeast Asia. In terms of capacity and traffic, Asia stands for over 38% and Europe for 53% of HEL's capacity. (CAPA 2018.)

With an average CAGR of 6.8%, transfer traffic is the fastest-growing segment with Chinese, Japanese and Russian travelers as the fastest growing groups. The passenger profile of HEL is distributed almost evenly between women (52%) and men (48%) travelers. The purposes of the travel of passengers using HEL are leisure travelling, business travelling, VFR and others each accounting for 53%, 28%, 13% and 6% respectively. High growth of traffic is enabled and supported by active route development activities and the number of non-stop destinations from HEL which are over 162 routes. The geographical location of Finland enables HEL to establish shortest routes between Asia and Europe with return flights in 24 hours and avoiding overnight aircraft parking for airlines (Figure 3). There are

24 direct Asian destinations and 120 weekly departures to Asia, making Japan, China, Thailand and Hong-Kong among top destinations in Asia. (Finavia Pricing and Analytics Manager 13.12.2019.)

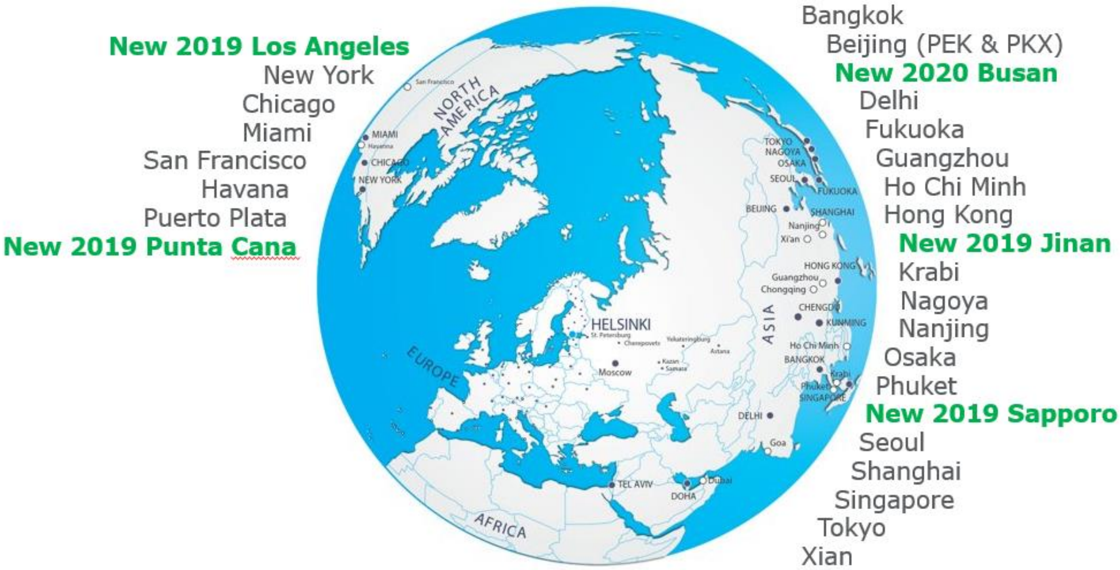


Figure 3. Long-Haul routes from HEL (Finavia Pricing and Analytics Manager 13.12.2019.)

In the recent years, HEL's connectivity in terms of destination numbers and seats has been improving significantly and overall connectivity rates have been growing around 68% between 2009 and 2019. International travel at HEL is rapidly increasing and many new routes has been launched. Following routes between HEL and Dubai Airport (DXB) operated by Flydubai (FZ), HEL and Belgrade Airport (BEG) operated by Air Serbia (JU) as well as HEL and Jinan Yaoqing International Airport (TNA) operated by Tibet Airlines (TV) were opened during 2018 and 2019. Finavia's route development team is working closely with different local municipalities, regional companies and businesses in order to accelerate and enhance the growth and attractiveness of other regions in Finland. (Finavia Pricing and Analytics Manager 13.12.2019.)

3. Route Development

In the past, airports were commonly regarded as public utilities focusing mainly on enabling the efficient and safe transferring of passengers and aircrafts with a quite inactive approach to marketing and commercial activities. Nowadays, with the liberalization of the aviation industry airports have become more competitive and commercially active giving marketing a new meaning as a core activity of numerous airports. With airlines and passengers as two main customers, airport's ability to influence passengers' choice of an airport is limited and largely dependent on the airport's location and the air services offered. Therefore, airports have most of their focus on marketing themselves to airlines which has an important effect. Based on the survey done in 2009 by Airport Strategy and Marketing (ASM), 96% of all European airports are actively involved in marketing themselves to the airlines. (Graham & Halpern 2015, 213; Stephenson, Lohmann & Spasojevic 2018, 45.)

With numerous ways to describe route development, Forsyth et al. in their Airport Competition book (2010, 133) described the airport route development, also known as Air Service Development (ASD), as a process that tries ''to demonstrate to air carriers that there is sufficient demand, and suitable airport facilities, to profitably operate a route from the airport''. Air service development is noticed to be a significant component contributing to the success and commercial viability of an airport. Even though airports are active in route development, the level of activity may vary among airports based on their characteristics. (Graham & Halpern 2015, 213-214.)

This chapter describes in detail the process of route development and key elements and components affecting successful route development activities. Furthermore, the regulatory environment, perception differences between airport and airlines on route development, the role of demand and factors affecting it as well as air connectivity are highlighted and discussed.

3.1. The Regulatory Environment

Air transport industry is heavily constrained by domestic and international provisions. The principle of sovereignty across the airspace above a country's territory dominates and works as a basis for the Paris Convention signed in 1919. (Doganis 2019, 20 & 22; Budd & Ison 2017, 10.) The approval to use the country's airspace is called traffic rights of air or freedoms allowing each state independently to decide on when by whom and how their airspace is utilized. Chicago Convention of 1944 is a negotiated framework upon which international air transport operations and systems are based. In the beginning this framework included five freedoms regulating and controlling air transport services on a bilateral basis, and later, four more freedoms of air were added. The first and second freedoms are so-called technical freedoms as they allow airlines to fly over and make an emergency stop for technical reasons in another country. The rest of freedoms are commercially important and called economic freedoms authorizing airlines to transport passengers and accumulate revenue in another country. (Bartlik 2016, 3-4; Belobaba, Odoni & Barnhart 2016, 20-22.)

ICAO (2004, 4.1-5, 1-8, 1-10) in its regulation of the international air transport manual defines freedoms (traffic rights of air) as:

> 1^{st} freedom: ''the right or privilege, in respect of scheduled international air services, granted by one State to another State or States to fly across its territory without landing.''
>
> 2^{nd} freedom: ''the right or privilege, in respect of scheduled international air services, granted by one State to another State or States to land in its territory for non-traffic purposes.''
>
> 3^{rd} freedom: ''the right or privilege, in respect of scheduled international air services, granted by one State to another State to put down, in the territory of the first State, traffic coming from the home State of the carrier.''
>
> 4^{th} freedom: ''the right or privilege, in respect of scheduled international air services, granted by one State to another State to take on, in the territory of the first State, traffic destined for the home State of the carrier.''
>
> 5^{th} freedom: ''the right or privilege, in respect of scheduled international air services, granted by one State to another State to put down and to take on, in the territory of the first State, traffic coming from or destined to a third State.''
>
> 6^{th} freedom: ''the right or privilege, in respect of scheduled international air services, of transporting, via the home State of the carrier, traffic moving between two other States.''
>
> 7^{th} freedom: ''the right or privilege, in respect of scheduled international air services, granted by one State to another State, of transporting traffic between the territory of the granting State and any third State with no requirement to include on such operation any point in the territory of the recipient State.''
>
> 8^{th} freedom: ''the right or privilege, in respect of scheduled international air services, of transporting cabotage traffic between two points in the territory of the granting State on a service which originates or terminates in the home territory of the foreign carrier or (in connection with the so-called Seventh Freedom of the Air) outside the territory of the granting State.''
>
> 9^{th} freedom or cabotage: ''the right or privilege of transporting cabotage traffic of the granting State on a service performed entirely within the territory of the granting State.''

Before starting international services to another country airlines need a bilateral agreement (Australian Government 2014). These freedoms are not directly granted to the airlines but are negotiated and agreed between two countries which in turn transfer these freedoms to the airlines filed in their jurisdictions. Negotiated freedoms are in the form of bilateral or multilateral Air Services Agreements (ASAs) allowing commercial air services to take place across their territories. The content and the level of restrictions of each ASA with detailed provisions and regulations on frequencies, capacity and traffics are distinctive and vary between the states involved. (Bartlik 2016, 7-8; Budd & Ison 2017, 10.)

United States domestic market liberalization was achieved by 1978 leading to era toward open markets. The European market was liberalized in three steps between 1987 - 1993 establishing a single market for EU states' airlines. First ''Open-Sky'' agreement was signed by US and Netherland in 1992 giving their airlines open market access. Open skies agreement between EU states in its entirety and the Unites States came into law in 2008. By 2017, there was 120 open-sky agreements with little difference to basic provisions. (Doganis 2019, 31-38; Belobaba et al. 2016, 29-31.)

3.2. The Route Development Process

As figure 5 (page 14) illustrates, the airport route development process starts with setting the objectives for route development. The scope and range of route development objectives varies greatly between airports. Halpern and Graham in their studies have shown that the center of interest is on the much challenging and risky objective of drawing new air services with new air carriers. Route development objectives comprise the expansion and maintaining existing air services with existing air carriers, attracting new air services with existing air carriers or any other improvements and changes in the air services as well. These changes commonly comprise activities such as changing the timing of the flight, aircraft type, frequency, fare and punctuality. (Halpern & Graham 2015, 214.)

Route development objectives usually have been divided into two categories related to connectivity and traffic matters. Objectives that target connectivity include served destinations in number, capacity and frequency. Traffic objectives, in turn, comprises volume and numbers of passengers and cargo arriving, departing and transiting the airport. Airport objectives can be specific and considered only by destinations (for instance, domestic or international) or business model of airlines (LCCs and network carriers for example) as well. (Halpern & Graham 2016, 70.) However, airports might have larger and intricate objectives related to broader benefits for the region such as development of the tourism, employment, trade and business activity empowerments which are dependent upon the nature of the airport and its relationship with different stakeholders in the region shown in figure 4 below. (Halpern & Graham 2015, 214.)

Figure 4. Diverse objectives of route development (Halpern & Graham 2015.)

The objectives of airports are influenced by many factors such as airport's vision and mission, the nature, size and location of the airport. A survey conducted by ASM (2009) showed that within Europe, more than 74% of airports concentrated their route development endeavors on short-haul services while 49% concentrated on long-haul services with network carriers. Smaller airports are also less active in attracting new routes than the larger airports due to their relatively small level of demand. Therefore, they might mainly target LCCs or charter carriers as a niche market. The focus on international services by larger airports reflects their large markets and potential demands they serve. (Halpern & Graham 2015, 214 & 217.)

Halpern and Graham (2016, 70) in their study summarize that after setting objectives for airport route development the process will continue with the actual route development process which is a complex and non-stop process which includes several stages as figure 5 demonstrates. The route development process consists of four key stages such as (1) analyzing market and identifying possible route opportunities (includes defining the catchment area), (2) business case improvements and negotiations, (3) establishing the route, and (4) engagement with stakeholders where all these steps are networked together. The aim of this process is to find a potentially viable route to operate and airports need to conduct a significant amount of marketing research with relevant stakeholders which plays a significant role in this process. (Stephenson et al. 2018, 46.)

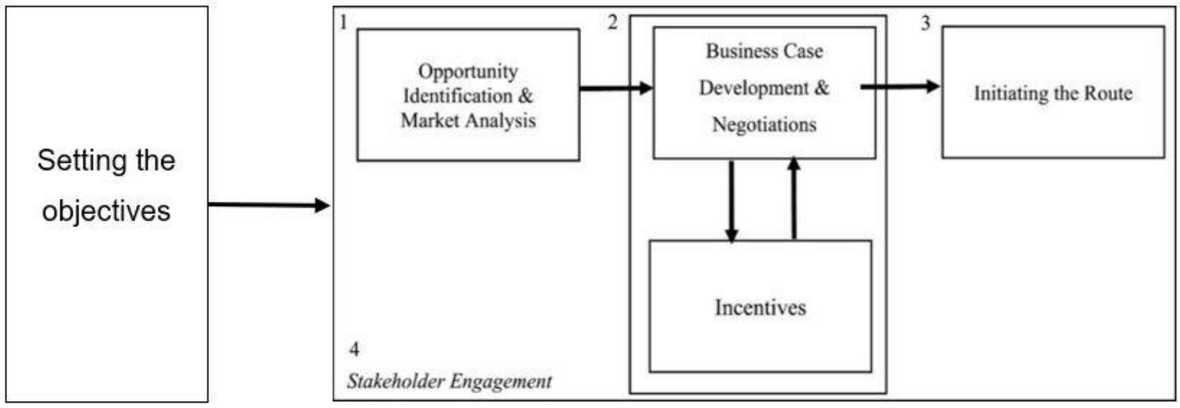


Figure 5. Route development process (Halpern & Graham 2016, 70; Stephenson et al. 2018, 49.)

The very first step of the process starts with defining airport's catchment area. The catchment area refers to an area within which airport services can be reached during a specific time period. Catchment area also refers to an area to which almost all inbound travelers are going to and from which almost all outbound travelers are initiated their journey. Isochrones or drive-times are designed to measure the time during which the airport is reached. With setting the boundaries to the catchment area, the airport needs to analyze the market for both inbound and outbound traffic by quantifying and estimating the level of demand for air travel in micro- and macroenvironments. These environments include variables such as the economic situation, population size, propensity for travel and demographic attributes of the region. Also, key trends which can affect the airport's network, market and competition capabilities and its ability to react to them should be assessed. (Graham 2018, 332.)

Once the market size, factors affecting passenger behavior and movement in its catchment area and the dynamic of the market are analyzed, then airports can identify unserved and underserved air services. This step requires a substantial amount of historical data obtained through sources such as the airport's own database, true origin and destination (O&D) demand and schedule data provided by the IATA, ICAO, Sabre and Official Airline Guide (OAG). Data obtained can be used as a basis for the assessments, forecasts of market share, demand and possible financial feasibility calculation of the route. Simply, demand can be estimated by considering factors such as income, population, purpose of travel and propensity to travel. Quality of Service Index (QSI), traffic allocation designs, regression analysis, market simulations or connection builders are tools enabling airports in the identification of potential route opportunities and generating growth forecasts for them. (Graham 2018, 332; Halpern & Graham 2016, 70.)

In the second step, once the proper research in forecasting demand has been conducted and possible new route has been identified, the airport operator needs to choose on how to approach the target airline for starting negotiations and presenting the business case. Suitable airline will be researched based on variables such as suitable network, capable fleet in terms of range, adequate capacity, business model, membership in an alliance, attitude and relationship toward the airport and the new route itself. (Halpern & Graham 2013, 69.) Building the relationship with airlines is a crucial component in the process of route development and this happens by having active personal meetings with the airlines. During the presentation traffic and financial evaluation, catchment area characteristics, seasonality, directionality, marketing support, airport facilities and profile will be shared and highlighted. (Halpern & Graham 2015, 215; Stephenson et al. 2018, 50.)

Another half of the second step involves incentives which will be discussed during the meetings with the airline. Airports need to make decision whether to provide incentive supports which have been categorized into two groups of financial (different direct payments) and non-financial (e.g. media and regulatory aid) incentives. Many airports tend to offer growth incentives besides the start-up incentives in which airlines has been showing interest. For airlines, the sustainability and market size are the decisive drivers of establishing new route and they are not influenced by any amount of financial incentives if the route isn't economically viable or if the essence of the route is not correct. (Halpern & Graham 2016, 71; Stephenson et al. 2018, 50.)

Initiating the new route is the third step of this process which varies from an airline and route to another. Initiating a new air route is a vast and long-term investment requiring thorough assessment. Network carriers may undertake market assessments for years while LCCs may launch a route in no more than a year where incentives play a significant role. (Stephenson et al. 2018, 50.) It is crucial for airports to direct the processes and procedures needed for dealing with the airlines at all phases of the route development process. Also, after establishing the route airports control and assess its route development strategy in order to secure the maximization of route opportunities so the common goals and benefits with airlines are preserved. (Halpern & Graham 2016, 71.)

During the implementation airports need to have a sufficient amount of resources both in terms of financial and human resources. Air route development is a complex process requiring adequate data and numbers of stakeholders. Stakeholders are engaged throughout the process and they are crucial elements of the air route development. Effective stakeholder management occurs through the identification and prioritization of the stakeholders. This could result in strategic competitive advantage. In addition to the airport-airline relationship, tourism companies, regional authorities, chamber of commerce, government and non-government local development institutions are significant stakeholders in the air route development. Destination Management Organizations (DMOs) are one of the key stakeholders of the process by promoting destinations. Active engagement with stakeholders ensures that local-market data are available which is highly valued by airlines. (Stephenson et al. 2018, 47 & 51.)

3.2.1. Understanding the Market

Knowing the market as a destination you are trying to sell to the airline is vital in the route development process. Giving access to profitable markets, where airlines can invest long-term and grow in the process is extremely vital. Airports also need to do market segmentation and catchment characteristics needs to be identified. Passenger traffic has different components and it is divided into O&D, transfer, leisure, VFR and business. Quantifying market tries to understand and estimate the achievable market out of total base market size which goes beyond only passenger traffic volumes. Core components of the market analysis are economic and social indicators, profile of tourism, passenger traffic data and cargo traffic data illustrated by figure 6 below. (Mayes & St-Laurent 17.7.2018.)

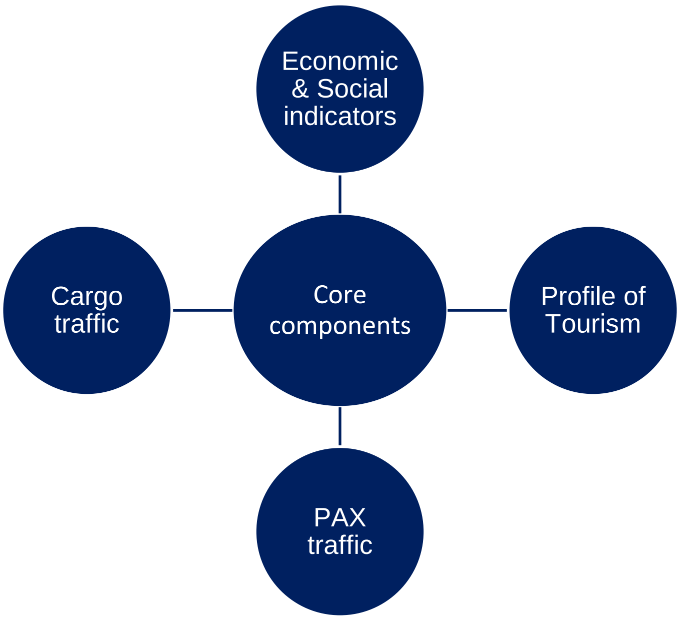


Figure 6. Core components of the market analysis (Mayes & St-Laurent 17.7.2018.)

Economic and social indicators quantify many aspects of economic and social factors. Business travelers are an important source of revenue for airlines therefore quantifying potential business travel to understand number of travelers, destinations flown and how often are important. Macroeconomic environment variables such as growth rates of economic and sectors of employment are crucial as the tendency for air travel is affected significantly by the situation and wellness of the economy. Regarding the route under consideration, understanding the trade situation and main exports and imports are important as well. As for social aspects, understanding the population trends and demographics such as development of age structure, gender and other indicators are important as larger populations generate more potential passengers to travel. (Mayes & St-Laurent 17.7.2018.)

Understanding tourism profile of the region and airport's catchment area is an important factor in terms of leisure passengers which is quantified and segmented in many aspects. For instance, the nationality, origin of visitors and the number of bed nights they spend need to be identified. Also, special events, festivals and interesting places of both origin and targeted destination need to be identified. Profiling ethnicity has an important role as they might generate VFR traffic as well. (Mayes & St-Laurent 17.7.2018.)

Airports obtain passenger and air freight traffic data through many different sources. As mentioned before, government statistics, IATA, ICAO, Sabre and airport own data are just few sources of traffic data. These Datasets provide information and insights such as O&D traffic volumes, trends, seasonality, revenues, yields, hub traffics, directionality of the traffic and transfer traffic volumes. Air cargo is a vital source of extra revenue for airlines since cargo carried in aircraft belly can make the separation between profit and loss on particular routes therefore trades between cities plays a huge role. Another vital part of analyzing market is to know what kind of hub is represented by the airport and what are its strengths and weaknesses. Geographical location, airport connectivity, strong presence of alliance grouping, diverse and an extensive network of destinations served with several frequencies, runway and airport capacity are few features of hubs. Being a good hub brings benefits such as efficient and strong aeronautical revenue, long-term investment from airlines, traffics for whole year, access to global markets and gaining more passengers through wide range of destinations. (Mayes & St-Laurent 17.7.2018.)

3.2.2. Understanding Airlines

Airlines are vulnerable to downturns in the economy facing issues such as unexpected events, low margins, instability in fuel price and high profits of airports. Airlines are segmented into three main groups of legacy carriers or full-service network carriers (FSNCs), LCCs and charters. Each group is subdivided further. FSNCs are using complex connecting traffic network models based on various passenger types focusing mainly on business and leisure traffic. FSNCs are a member of an alliance and have different products such as several cabin classes and lounges on offer for passengers. FSNCs are enjoying interline-connecting products and a versatile fleet in order to satisfy changing requirements in demand. (Mayes & St-Laurent 17.7.2018.)

Network and business model of LCCs are not as complicated as FSNCs. LCCs concentrate on the point-to-point (P2P) network model excluding other connecting opportunities. LCCs mainly have a single-type fleet with high utilization rates and high-speed turnarounds. LCCs are largely operating to the secondary airports with fairly low P2P fares focusing on ancillary revenues. Despite the differences, lines between FSNCs and LCCs are becoming gradually blurry as the partnership between them increasing. (Mayes & St-Laurent 17.7.2018.)

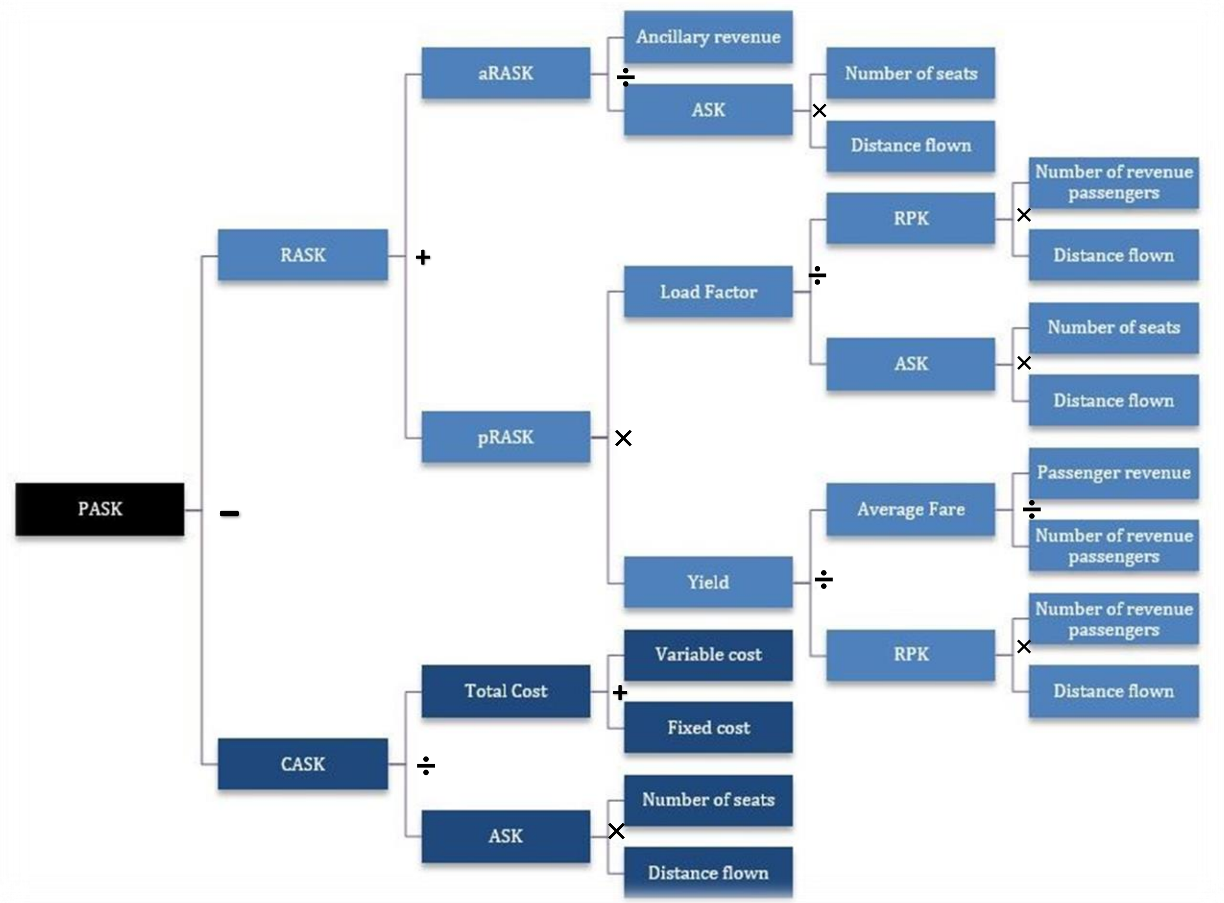


Figure 7. Capacity, traffic and revenue metrics (Finavia Pricing and Analytics Manager 13.12.2019.)

Capacity, traffic and revenue of airlines are measured by different metrics such as Available Seat Kilometers (ASKs), Revenue Passenger Kilometers (RPKs), Passenger Load Factor (PLF), Revenue per Available Seat Kilometers or unit revenue (RASK) and Cost per Available Seat Kilometers or unit cost (CASK) as figure 7 above summarizes. The capacity of airlines is measured by ASKs and calculated as: the number of seats multiplied by kilometers flown. For instance, a 250-seat Airbus 330 flying 2000 km generates 500,000 ASKs. In simpler terms, capacity means the number of seats airlines have in the air at any flight and time. The traffic of the airline is measured by RPK, calculated by multiplying the number of fare-paying passengers in distance flown. For instance, if the mentioned flight has 220 paying passengers, it generates 440,000 RPKs. The PLF for this flight then would be 88%. PLF measured by dividing RPK by ASK multiplied by 100% indicating the ratio between them. (Mayes & St-Laurent 17.7.2018.)

The number of passengers multiplied by average one-way fare divided by RPK formulates the yield for airlines. Yields and distance flown are highly interdependent. As the length of flight increases the yield/RPK decreases, indicating that each flight has different yields. RASK refers to the ratio between total revenue and ASK. Total RASK includes both ancillary (aRASK) and passenger (pRASK) revenue streams. Respectively, CASK indicates the ratio between total cost and ASK. However, due to distinctive cost structure of each airline performing CASK is not an easy task. The airline generates profit when RASK exceeds CASK meaning that profit available seat kilometer (PASK) is positive, and when it does not exceed CASK, they lose money and PASK is negative. Basically, this is calculated by $PASK = RASK - CASK$. (Mayes & St-Laurent 17.7.2018.)

Average PLF has a key role in configuring the frequency of flights between origin and destination cities. Higher PLF does not directly indicate higher RASKs for the airline. Flight time, frequency, type of services and fares are variables influencing the PLF. Airlines, legacy airlines largely, have established policies regarding PLF which needs to be met. Frequency of flights between origin and destination cities is determined by dividing the number of passengers by capacity multiplied PLF ($frequency = \frac{PAX}{capacity \times PLF}$). There is a reverse relationship between frequency and PLF. (Bazargan 2004, 33-35.)

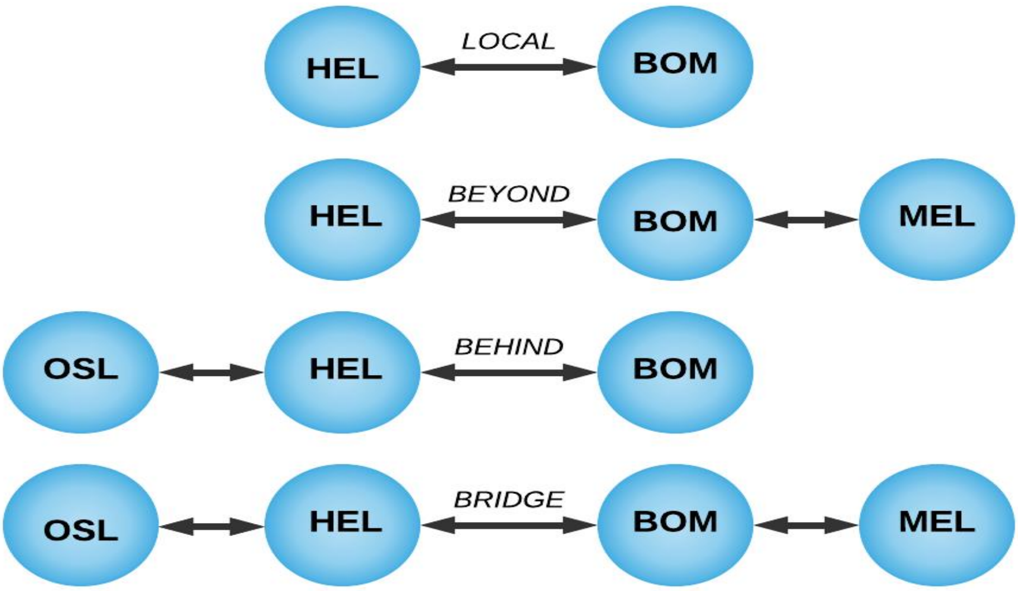


Figure 8. Passenger leg flow (leg flow) modules.

In airports' perspective passengers are broken into four groups of local, beyond, behind and bridge displayed in figure 8 above. This Passenger leg flow (leg flow) segmentation indicates what kind of passengers have been in the plane and not reflecting the true O&D flows. The O&D flow is the total number of passengers flying between any two points. Leg flow analysis is the total of actual passengers flown between two points. Leg flow analysis allows to gain deeper understanding into levels of the actual traffic. (Sabre 2014.)

Local traffic represents passengers flying a non-stop flight between origin and destination airports (or two cities) without changing any airplanes. This is so-called P2P traffic pursued largely by LCCs. Passenger flying from HEL to BOM showed in the above example are considered as local traffic. HEL as Point of Origin (POO) and BOM as Point of Destination (POD). Passengers originating in HEL flying via BOM onward and connecting in BOM to beyond destination, in this case Melbourne (MEL), are beyond traffic. Behind traffic starts somewhere before the origin of an O&D traffic. For example, from HEL's perspective, passengers starting their journey in Oslo (OSL) connecting in HEL to go to BOM, are considered as behind traffic. Finally, bridge traffic originates behind O&D traffic and continues beyond it. For instance, passenger starts its trip in OSL, connecting in HEL to BOM, and connecting in BOM to MEL, are considered as bridge traffic. (Goedeking 2010, 8.)

In addition to forecasting purposes, these traffic segmentations are used by airlines for revenue management purposes as well. Yield management based on legs concentrates on maximizing revenue on route level. On the contrary, yield management based on O&D traffic concentrates to maximize total revenue of the network. Leg traffic (Mayes & St-Laurent 17.7.2018.)

Cost structure of an airline

Purposes for analyzing cost structure of an airline usually depends on its intended use. These costs are studied for different purposes such as to generate profit and loss assessments or to produce detailed flight cost assessments for route planning purposes. The costs of airlines are divided into two main groups of Direct Operating Cost (DOC) and Indirect Operating Cost (IOC) which are subdivided further. Cost of flight operations, maintenance and overhaul, and depreciation are part of DOC. IOC comprise ground expenses, passenger services, ticketing and promotion, general and administration as well as other operating costs. (Doganis 2019, 43 & 45.)

Flight operation is the largest component of DOC involving flight crew expenses, fuel, airport fees, navigation charges and aircraft insurance. Flight crew expenses are calculated on route basis using an hourly cost or so-called block hours. Block hours are calculated from the moment that aircraft leaves the gate of origin airport to the gate of destination airport. The fuel used during flight depends on many variables and are levied by fuel suppliers based on the refueled amount. Airlines also need to pay airports landing and passenger fees, and other enroute navigation and overfly charges to governments. These charges are levied based on the Maximum Take-Off Weight (MTOW) of an airplane, passenger numbers and distance flown. Aircraft insurance is last component of flight operation costs which is based on variables such as safety record of airline, desired coverage and the location of the operation. Different aspects of the maintenance and overhaul are covered by the maintenance costs. These aspects are the routine line maintenances, comprehensive overhaul checks, labor related to that and cost of spare parts. Aircraft maintenance is calculated by aircraft type and for routes by block-hours. Depreciation is one other element of DOC. (Doganis 2019, 45-48.)

Station and ground cost are those related to the services provided at the airport for the airlines including staff salaries, handling services of aircraft, passengers and cargo. Station and ground expenses are at their largest for airlines at home hubs. Other expenses are directly associated with passengers and services provided to them. These services are catering, lounges, compensations paid in irregular situations and benefits provided to the frequent flyers. Sales and promotion costs encompass expenses associated with office, promotion and sales activities. General and administration costs are the last part of IOC which make relatively small proportion of total operating costs. (Doganis 2019, 50-52.)

3.3. Factors Affecting Route Development

Nowadays, airports are actively involved in route development than before. Successful route development enables an airport to grow which contributes to the success of airport’s commercial side and brings broader benefits to the region in terms of employment and connectivity. Research conducted by Halpern and Graham (2016) indicates that to some extent privately operated airports are more active in route development than those airports not privately operated. For airports with small and limited budgets airport marketing is challenging as such and according to a survey undertaken by ASM (2009) discovering that limited budget is the primary reason of zero activity in route development. (Halpern & Graham 2016, 71.)

The same study of Halpern and Graham also found that small airports have a substantially lower level of activities in route development than the larger airports as they may have a smaller markets and demand to grow. In airport business environment point of view, market growth and airport constraints to have a huge impact on the total performance of route development at the airport. Market growth as a positive factor and airport constraint and limitations as negative factors. (Halpern & Graham 2016, 72 & 77.)

In terms of attracting, growing and maintaining air services, study conducted by Graham and Halpern showed that there is a strong relationship between airport route development activities and route development performance. Two main and crucial activities which have a substantial impact on airport route development performance are collaboration and active personal selling activities to the airlines. Collaboration highlights the need of working with other stakeholders while developing and evaluating strategies for route development. Using strategic marketing copartnerships, developing mutual advertising and marketing campaigns with other airports and airlines can be the exemplary approaches of collaborating. (Halpern & Graham 2016, 75.) As mentioned above in section 3.2., stakeholders usually are regional development organizations. Tourism businesses and DMOs are playing an important role in the development of the highly successful tourism destination. Active and close collaborations between stakeholders are crucial in creating opportunities to grow demand and transforming a hub into a tourist destination. Singapore and Dubai are examples of an active stakeholder engagements and being fruitful. (Spasojevic, Lohmann & Scott 2019, 2-3.)

Airports and stakeholders in order to advertise potential route opportunities to the airlines are conducting active and targeted ways of personal selling. Examples of these activities practiced by airports are inviting selected airline to visit the airport, meeting airlines at their headquarters, participating in route development events and producing route related reports for the airline. Other activities such as sending marketing materials, providing route development information and data, assisting airlines in the route development process and removing obstacles, altering sites and services in order to meet airlines' requirements and the desire to offering suitable pricing are practiced by airports. (Halpern & Graham 2016, 74-77.)

3.4. The Airline Perspective on Route Development

Having an Air Service Agreements (ASA), an operation permission, in place is the very first step in opening the negotiations with the airport operators for the route development. Negotiations between airlines and airports cannot start without the ASA. The planning process of airlines happens in three steps of fleet planning, network/route planning and schedule planning. From an air carrier's perspective, route development is a continuous process including market analysis and demand forecasting to establish a destination's commercial feasibility. Forecasting demand works as a basis for assessing operating cost and overall route profitability as key drivers in route planning for airlines. Market size, size of population for both cities, network contribution (behind, beyond and bridge), and passenger segmentation (holiday, VFR or corporate) are just some of airline's key decision-making criteria for route development highlighted in figure 9 below. (Stephenson et al. 2018, 46-47; Belobaba et al. 2016, 159 & 170.)

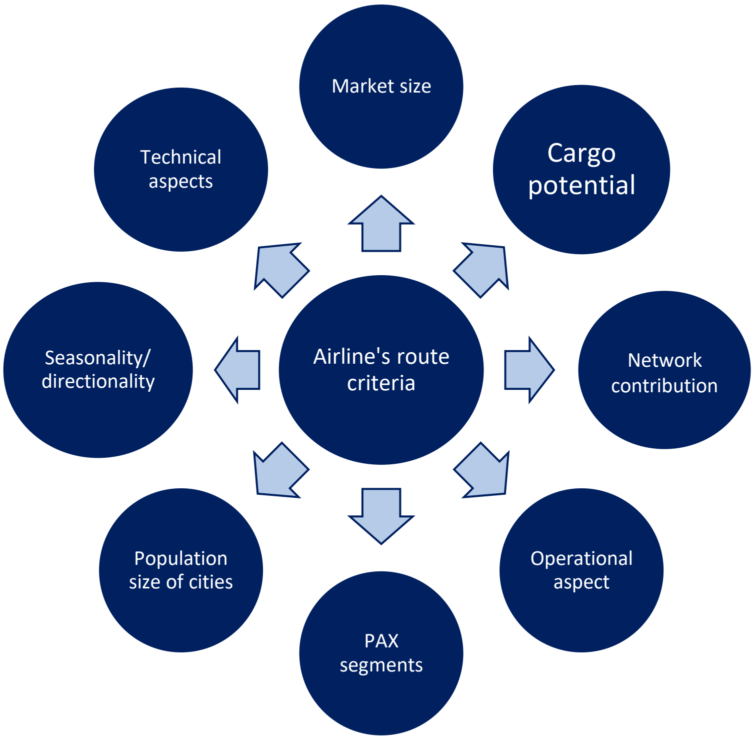


Figure 9. Airline decision-making criteria for a new route (Stephenson et al. 2018, 47.)

Location of the airport, awareness and attractiveness of the destination, competition with airlines and other airports, as well as positive development in local economic are other crucial factors enhancing network growth of an airline. Attracting and engaging with different market segments such as inbound, outbound and other mixed passenger segments are important in securing the sustainability of the route. Strong route attraction across different segments allows the air carrier to preserve passenger load factors, decrease seasonality and compensate risks of demand falling in another market segment. Incentives are another factor offered by airports affecting airline's choice of route. Another purpose of the incentives is to produce extra demand for the route. (Stephenson et al. 2018, 47.)

Using a hub-and-spoke network model with 'connecting bank' allows airlines to provide more services for more O&D markets. Hub refers to the home-base of the airline and spoke to the destination city. 'Connecting bank' or 'waves' is a planned operation where airplanes arrive at the hub, passengers are transferred to the connecting flight then airplane departs with them on board to the final destination. With hub-and-spoke model in use air carriers can achieve larger market shares due to their capabilities to consolidate traffic from other O&D markets. Despite the relative low demand for local spoke-to-hub, opening new route and feeding connecting passengers can make positive contribution to carrier's overall network profitability. Therefore, with avoiding cannibalization or replacement of traffic from other flight legs and such air carriers using these models are heavily dependent on connecting passengers. (Belobaba et al. 2016, 171-175.)

The selection and decision-making process of a new route for an airline is a tactical and strategic one based on airline's vision. Flying with larger airplanes with lower CASK for longer distance affects the cost structure of the air carrier. As mentioned before, commercial issues are forceful factors in the route decision-making process, which is dependent on many factors. The market share of the airline for the route under evaluation will be estimated based on total demand forecast. The estimated market share is affected by the planned frequencies, times of departure, price as well as quality of service. For instance, slot constraints or unappealing flight times where the share of demand is low affects the viability of the route. Furthermore, technical issues such as available airplanes with adequate range and capacity or airport facilities, have an equal effect on the evaluation of the route as economic issues. (Belobaba et al. 2016, 175-176.)

Many elements, directly and indirectly, affect the capabilities of an airline to retain or suspend a route. The lack of profitability and sustainability of a route are the main reasons for suspension influenced by quality, price and demand in long-term. Demand itself is a consequence of geo-, socio-economic and seasonality factors. Controlling demand is not an easy task and requires market research, collaboration between stakeholders and numerous market schemes to key segments. (Lohmann & Vianna 2016, 200 & 204.)

Lohmann and Vianna (2016) in their article pointed out that the lack of stakeholders' engagement and collaboration can be crucial elements to suspending the decision. In order to maintain the sustainability of a route, airports need to strengthen and emphasize their relationships with the airlines and look at different aspects of the flight to enhance profitability and sustainability of the route. These aspects are the level of load factor, suitability of the aircraft type, the timing of the service and adequateness of the promotion and marketing. By sharing knowledge and data transparently stakeholders can improve the sustainability of the route and attractiveness of the destination. (Lohmann & Vianna 2016, 202, 207.)

Hypothetical profitability analysis example

As mentioned before in the section 3.2.2, matching the supply with demand is about route profitability and the airline is generating profit when RASK exceeds CASK. The following hypothetical example shows profitability analysis for a nonstop route suggestion of Tehran International Airport (IKA) – Hong Kong International Airport (HKG). Tables 2 and 3 demonstrate the revenue and operating cost calculations using an Airbus 330-300 aircraft with 250 seats. An estimated break-even point per annum for this route is shown in the calculations for a year of operation, representing 0% of operating profit margin. Operating profit indicates the profit after cost. Operating profit margin (%) is the operating profit divided by total operating revenue. (Belobaba et al. 2016, 177.)

Table 2. Revenue calculation for hypothetical route example (adopted from Belobaba et al. 2016, 177.)

Demand and fare estimates for year	Annual Demand	Prorated avg. OW fare	Total revenue
Total IKA-HKG PAX (both directions)	120000		
Expected market share for one daily flight	70 %		
Local IKA-HKG PAX on new flight	84000	570.00 €	47 880 000.00 €
Connecting Traffic			
Behind traffic	23500	500.00 €	11 750 000.00 €
Beyond traffic	13000	460.00 €	5 980 000.00 €
bridge traffic	6500	400.00 €	2 600 000.00 €
Total PAX	127000		68 210 000.00 €
Additional cargo revenue	10 %		6 821 000.00 €
TOTAL revenue			75 031 000.00 €

The table above illustrates detailed information on demand and revenue calculations in order to reach break-even point. In this hypothetical example, the total local O&D demand forecast for this route on both directions is 120,000 passenger per year, of which the airline estimates to achieve 70% of the demand forecasted at an estimated average fare of 570€ for one-way (OW) travel. The airline expects to capture larger O&D market share between IKA and HKG as this would be the first nonstop air service provided for this city-pair. With these airline’s estimations, the total passenger revenue will be around 68.2 million euros per year. In addition to this, airline has estimated that cargo revenue will be around 10% of passenger revenue resulting in total revenue of 75 million euros per year. (Belobaba et al. 2016, 178.)

As for costs, table 3 displays the total cost calculations based on block hours used on both direction for cost calculation purposes. Block hours refer to the time between departing gate and arrival gate. Airlines have their own operating cost estimations per block hours based on their current aircraft types. Again, in this hypothetical example the cost inputs are pure assumptions based on existing comparable operations and in order to reach the break-even point. The cost inputs are on the left side of table 3 and the calculated measures on the right side. Total direct operating costs for this route is estimated to be around 48.6 million euros, and indirect operating cost to be around 26.3 million euros leading to 75 million euros in total cost. Based on the cost calculations and inputs for an entire year, the route is forecasted to reach its break-even point at the PLF of only 71% generating 0% of operating margin. (Belobaba et al. 2016, 179.) In this example, the airline in order to capture positive operating profit it needs to either reduce costs or increase revenue by selling higher fares for instance. This route can become profitable by increasing only 30€ in local prorated average OW fare capturing already 3% of profit margin.

Table 3. Operating cost and operating profit calculation for hypothetical route example (adopted from Belobaba et al. 2016, 178.)

Inputs and assumption			**Calculated measures (annual)**	
Aircraft type	A330-300		Annual flights	716
Number of seats	250		Block hours	6086
Total annual flights (each directions)	358		PRKs	793750000
block hours IKA-HKG	8		ASK	1118750000
block hours HKG-IKA	9		PAX enplaned	116500
distance between IKA-HKG (KM)	6250		average load factor	71 %
Aircraft direct operating cost (DOC) per block hours				
Crew cost	950.00 €			
Fuel	5 330.00 €			
Ownership	800.00 €		Total DOC	48 688 000.00 €
Maintenance	920.00 €		PAX servicing	14 295 770.00 €
total per block hours	**8 000.00 €**		Traffic servicing	2 330 000.00 €
			Aircraft servicing	1 360 400.00 €
Indirect operating cost			Promotion and sales	4 774 700.00 €
PAX service	0.018	per PRK	other genrela costs	3 582 130.00 €
Traffic servicing	20.00 €	per enplanment	TOTAL COST	75 031 000.00 €
aircraft servicing	1 900.00 €	per departure		
Promotion and sales	7 %	of PAX revenue	**Operating profit**	**0.00 €**
other general costs	0.003 €	per ASK	**Operating profit margin**	**0 %**

It is clear that the profitability evaluations are relying largely on the accuracy of each variable. Airlines with these kinds of evaluations can test the sensitivity of each variable and gain better understanding of overall potential for this route under different circumstances in the future. (Belobaba et al. 2016, 179.)

3.5. Drivers of Air Transport Demand

Wittmer, Bieger and Muller (2011, 137) in their Aviation Systems –book describe that the demand for air transport has been seen as the primary driver for the entire aviation system and value chain development. The growth of air transport demand has been continuous but on a slower pace. From the airline's point of view, understanding demand is crucial so correct and appropriate strategic and operational decisions can be made. Demand for air transport is affected and derived by various factors according to the market being evaluated which influence the passengers' decision regard flying. As the figure 10 below summarizes, these factors have been classified between two groups of service-related (aviation) and geo-economic (non-aviation) factors. Each group has been subdivided further. (Lohmann & Vianna 2016, 200-202.)

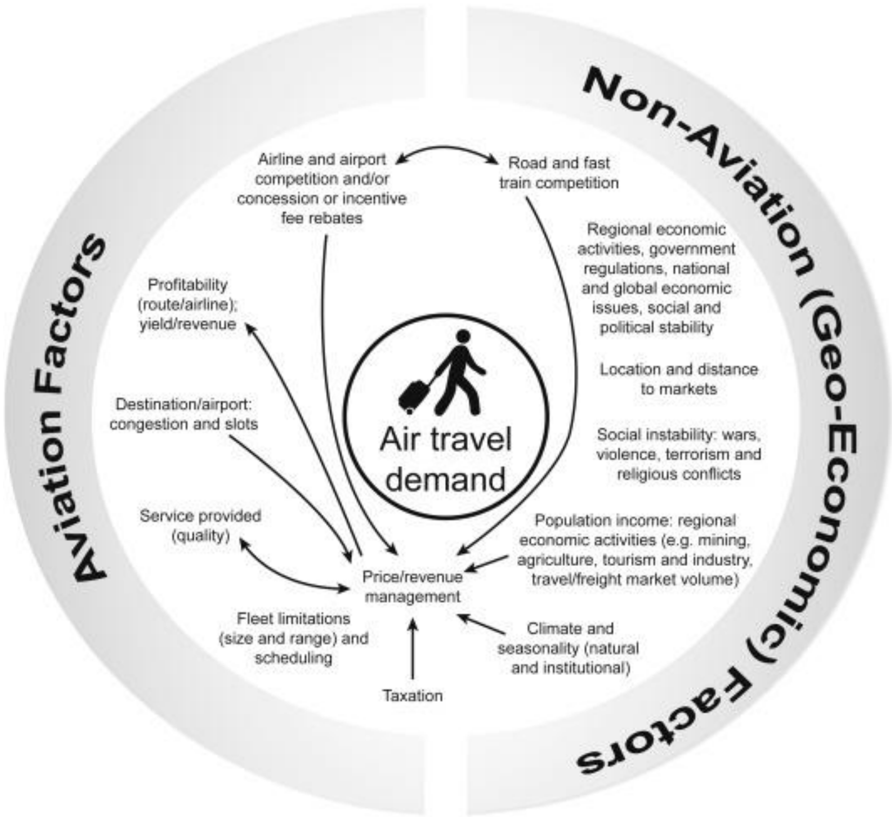


Figure 10. Factor affecting demand in a nutshell (Lohmann & Vianna 2016.)

Budd and Ison (2017, 26) explained that aggregated economic activities are the main drivers of the air travel demand. Geo-economic factors, simply macroeconomic factors, are those that are not in the control of an airline or airport and subdivided between activity and locational factors affecting demand. Macroeconomic variables are GDP growth, the amount of personal disposable income, demographics of passengers, urbanization, the level and nature and types of trades and even fuel prices. Demographic features are variables such population, structure and distribution of age, cultural ties and structure, educational characteristics, the number of paid holidays, and attitude toward traveling. Zheng and Graham (2018) pointed out that locational factors cover distance between origin and destination, the attractiveness of the destination, location and accessibility of the airport, markets for business and tourism. (Graham & Halpern 2018, 314.)

Population can set limitations for the demand as well. As an example, despite the high personal incomes a relatively small population of Singapore sets limitations for potential demand in terms of Singapore-originating air travel. As a result, for airlines such as Singapore Airlines it is crucial to develop 5th and 6th air traffic freedoms. Social attitudes toward travel vary in different markets, for example, in Europe also attitudes are changing where people are taking shorter leisure breaks more often mainly due to demand stimulated by low fares made available by LCCs. Demand for leisure travel is linked to the attractiveness of individual destinations, and to generate significant volume of demand destinations need to have both a certain distinctive scenic advantage and proper infrastructure to satisfy tourist demands. (Doganis 2019, 178-179.)

There is a strong relationship between GDP growth and demand. Variables such Foreign Direct Investment (FDI) and income per capita are playing an important role in stimulating demand. Development of economic and populations are a catalyst for acceleration of air passenger growth demand. In some emerging countries fares have had a major impact on the demand indicating highly responsive nature of demand to the price. The movement of the individuals is not based on the willing to use the airport or airline services but to be at the destination. Therefore, price and income have a direct influence on the financial capability of population on leisure trips in particular. (Budd & Ison 2017, 26 & 37; Lohmann & Vianna 2016, 201.)

Service-related factors, as illustrated in the figure 10**,** are about fares, profitability and quality of service provided by both the airline and airport. In addition to the exchange rates and fuel price, fares can be influenced by airport charges influencing the demand ultimately. The aspects of service quality are linked to variables such as departure times, frequencies, type and size of the airplane, airport services, in-flight entertainment opportunities as well as safety and security image of the company. Other variables such as taxation, costs, availability of slots and destination dynamics can impact demand indirectly. (Lohmann & Vianna 2016, 200.) According to Budd and Ison (2017, 36), simultaneously, demand and traffic growth can be stimulated further by increasing capacity in terms of seats, frequency and more destinations.

Zhang and Zhang (2018, in Graham & Halpern 2018, 174-175) mentioned that the distance of the destination is another factor affecting the demand for air transport. Fewer long-haul flights will be carried out as the longer the distance between cities gets and eliminating other modes of transportation at the same time. However, as for short-haul destinations, air transport is competing directly with other modes of transport. Airport's location and its facility features, ground accessibility, congestion and non-aeronautical services are some of the attributes of airports affecting passenger demand. Safety and security as one of the most critical factors are not just related to the companies but to the destinations as well. Natural disasters, SARS, terrorist attacks and geo-political tensions are examples influencing air transport demand negatively. (Graham & Halpern 2018, 174-175.)

Swift growth in technology, global trade and financial services will lead to growth in demand for air transport. There is a direct link between business travel and economic activities. (Budd & Ison 2017, 36.) However, development of new communication channels such as Skype may have an opposite effect on the demand to some extent. Few studies also suggest that budget limitations, personal conditions and concerns about travelling by air are preventing people from flying. (Graham & Halpern 2018, 174 & 315.)

3.6. Forecasting Demand

The most critical area of airline and air transport management is forecasting. Forecasting is quantifying demand in a period of time in future upon which many of both strategic and operational decisions such as aircraft acquisition, fleet plan, launching new routes and other long-term investment decisions are based. Forecasting is always uncertain as micro- and macroenvironment conditions keep changing. Assuming all other variables affecting demand being equal, airlines usually forecast total demand on a route or set of routes and then they calculate their own share and traffic on those routes. Forecasting traffic demand on each route based on market segments may result in a more accurate forecast as different segments have different demand elasticities. Evaluating and forecasting demand for new routes represent a different kind of challenges to airlines which is highly risky as they have no or little experience and data. (Doganis 2010, 188-189.)

There are different types of forecasting methods each with specific objectives. Forecasting can be performed on short-, medium- and long-term each spanning between one month to one year, one to three/five years and between three/five to ten years respectively. Mediumterm forecasting usually includes route planning. The availability and accuracy of data as well as the purpose of forecast are considerations affecting the choice of used forecasting method. Quantitative, qualitative and decision analysis are the main forecasting methods used for forecasting and each has been subdivided further. (Wensveen 2015, 268, 270; ICAO 2006, 1-2.)

Qualitative method includes executive judgment, market research and Delphi techniques. These techniques are based on understating of the market. Judgmental method is used widely among airlines to adapt and adjust more mathematical forecasts, usually done by a person who has expertise in a specific region or market. They have usually first-hand knowledge and understanding of present traffic levels, economic and competition situations and factors which may not be available through data-based techniques. The overall purpose of market research is to build an empirical understanding of the market dynamics and how demand between markets differs. This combined with other sociological, demographic and economic factors help to forecast future demand. Airlines are conducting market analysis either on a regular or ad hoc basis. With the case of entirely new routes in developing countries when the historical traffic data is little or none, market research techniques are useful to evaluate future demand. The Delphi technique is a less used approach which is appropriate for aggregate forecasts where it basically gathers information from different experts till unanimity is reached. (Doganis 2019, 190-191; Wensveen 2015, 277.)

Another broadly used and relatively sophisticated forecasting method is time-series analysis or trend analysis. The idea is to perform a projection into the future based on what has happened in the past assuming that whatever elements influencing air traffic in the past will continue to influence in a similar manner. Time-series analysis requires precise and detailed traffic data which is divided into linear and exponential forecasts. In the linear forecast, traffic will grow by a constant absolute amount with each period of time but for exponential forecast traffic will grow by a constant percentage with each period of time. As for the last, econometric or casual method pins the relationship between demand and other economic, social or supply factors. This model tries to measure if one of the variables changes how it would affect the level of the demand. Econometric method contains a regression, air freight and gravity models. (Doganis 2019, 192-201; Wensveen 2015, 270 & 273-276.)

3.7. Air Connectivity

The choice to start a route always belongs to the airline and the airport connectivity has significant importance for regions and they have been supported by different tools such as route development incentive programs and campaigns. Basically, connectivity measures how easily other destination can be reached via an airport enabling regional authorities to assess and monitor the level of services provided. Connectivity holds a key position in airports' strategy and is used to benchmark airports and their performance against others. Measuring connectivity requires specific indexes and parameters such as seats offered, frequency of services and the number of destinations. (Redondi, Malighetti & Paleari 2011, 714-715.)

Many factors such as deregulation, technology and penetration of LCCs into different markets have changed airports' competitive behavior and made travelling more efficient and accessible. Air connectivity is a key element in a country's economic growth opportunities, and it appeals to business investments and tourism. Strategic decisions to improve and develop air connectivity is based on understanding how air connectivity is related to the economic growth, measured and changed. (Morphet & Bottini 2014, 11.) ACI (2019b, 6) classifies air connectivity into main four groups of direct connectivity, indirect connectivity, airport connectivity and hub connectivity. ICAO (2019b) defines connectivity as a ''measurement tool for airline's and airport's networks and their ability to move passengers, mail and cargo between two points which is based on a) shortest possible time b) with optimal user satisfaction and c) at the minimum price possible''.

Air connectivity not only allows passengers to a wider network with better and frequent services but also supports and strengthens a country's economy and business investments. Four elements of geography, airport's infrastructure, business model of the airlines and regulatory and economic situation of a country are shaping air connectivity. Geographical location can give the country either the competitive advantage or the need to develop well connected network. Also, airport capacity and infrastructure need to be sufficient enough to develop air connectivity. In addition to these, the business model of an airline shapes air connectivity as well. For instance, during 2003 and 2013 the number of routes and air connectivity rate have increased by nearly 70% due to LCCs in Europe. Regulations can have roles of both facilitator and an obstacle. The level to which a state is willing to liberalize its markets affects the air connectivity and routes to be opened and increase the level on connections. (Morphet, Bottini 2014, 14-19; Bannò & Redondi 2014, 356, 362.)

4. Empirical Part

This chapter focuses on the utilized research methodology and reasoning behind it. It involves the research methodology, data collection and analysis, reliability and validity as well as research process. The objective of this research is to study the number of passengers and feasibility assessment of this route in question whether to see if the route is viable to operate based on the results of data analysis.

4.1. Research Methodology

Identifying an issue or a problem is a starting point of any research. Selecting a right and proper research method is crucial in understanding the problem and answering to the question. Research methods are divided into two groups of qualitative and quantitative methods. (MacDonald & Headlam 2011, 7 – 9.) Despite the similarities between the research methods, quantitative method measures the theory whilst qualitative method seeks to understand it. The quantitative method incorporates with numbers and quantified data while the qualitative method incorporates with non-numerical data and texts. (Saunders & Lewis 2012, 85.)

Quantitative research method aims to use various variables to identify patterns and generalize an assumption based on the study. To have an effective quantitative research, this methodological approach requires large-scale samples which can be difficult to obtain in some cases. Quantitative research aims to determine the cause-effect relationship, and this methodological approach may not provide in-depth answers on researched matter. (Grønhaug & Ghauri 2005, 109–110; Choy 2014, 99 & 101.) Conversely, the qualitative research method aims to use various variables such as emotion, feeling and attitude to understand the individuals. This methodological approach focuses on understanding an in-depth analysis rather than generalized scope. In some cases, the researcher can use a multi-method approach combining both of the qualitative and quantitative research methods to expand and enhance the collection of the data and research results. However, focus should be mainly on one of the methods. (Silverman 2006, 48; Grønhaug & Ghauri 2005, 109-110.)

Since the research question for this thesis concentrated on the number of passengers travelling and possible feasibility assessment of the route so the quantitative research method in data collection and analysis was chosen. It focuses on describing a specific phenomenon based on numerical data which statistically can be analyzed. In this thesis, two data analysis tools were used to analyze the collected numerical data. This analysis was divided into two parts of market analysis and route feasibility analysis. The first part of this analysis focuses on the analysis of passengers travelling between India and Finland and to which cities. The opportunity identification analysis is included in the first part as well. The second part of the analysis assesses the feasibility of the new route between HEL – BOM based on results reached in the first part.

Furthermore, on the side qualitative method was undertaken to support the quantitative research results and elevate the validity of the study. Veal A.J. (2011, 239-241) in his Research Methods for Leisure and Tourism –book describes that an in-depth interview is a semi-structured interview which differs from structured and unstructured interviews, where the interviewer is trying to gain more accurate reasons, clear picture and understanding of the interviewee's thoughts, position and behaviors. Ng and Coakes (2014, 103) in their Business Research -book observe that preparing and asking pre-drafted questions enable the interviewer to ensure some coherence and consistency throughout the interview.

Since the quantitative approach is not able to offer in-depth explanations therefore in-depth interviews were undertaken to gain more detailed information on the subject. For this study, four aviation experts were interviewed in three sessions of which one interview was done face-to-face and two by email. Interview results backed the quantitative analysis and results of this study.

4.2. Data Collection and Analysis

Firstly, the topic and how it should be approached was discussed with Finavia's route development team. We decided to analyze passenger numbers of the route and if the route is viable to operate. Two different data collection methods were used for this research – both primary data and secondary data. Primary data is raw and new data collected by the researcher for a specific goal and purpose. On the contrary, secondary data already exists and the investigator is the secondary user. (Hartford 2020.)

For the primary data, a semi-structured interview was used. Interviews were conducted in-person and by email with professionals and experts within route development fields. Semi-structured interviews allowed them to freely express their professional opinions and insights. All interviews were supposed to be in person, however, due to the time restraints and costs of travel, email was chosen as an alternative option. All of the interview data was collected between 01.10.2019 - 04.02.2020 and notes were taken during the face-to-face interview. In the beginning of the interview, all interviewees were informed about the sensitivity of the matter and that all information provided will be held confidential unless otherwise stated. All the interview questions were in English and one of the interviews was held in Finnish which was translated into English later.

As for the secondary data author reviewed extensive literatures on route development and matters related to the topic which is data researched by others. The historical data used for this study was collected mainly using Sabre Global Demand Data and Center for aviation CAPA databases. Traffic flow data contained all direct and indirect passenger flying between HEL and India. The O&D data and leg flow data were collected between 2014 to 2019. Also, resources and data freely available on IATA and ICAO webpages were used.

4.3. Reliability and Validity

The concept of reliability and validity are utilized in researches aiming at measuring the credibility of a process. These concepts go mainly hand-in-hand and aim at the consistency and accuracy of a research. Reliability has a focus on the consistency and integrity of the study while validity measures the accuracy and truthfulness of the study. Reliability studies whether the results of the research would be the same if the research would be performed under the same conditions at different times. Validity of the research is high when the results are aligned and correspond the objectives of the study. (Yin 2018, 43-46; Middleton 2019.)

This research has been carried out in a close and active cooperation with the commissioner. Information regarding traffic data was shared by the commissioner using Sabre database and the data was analyzed using Excel Pivot and partly by Power BI. Carefully chosen experts and professionals within the route development field, on both side of the proposed route, were interviewed as a qualitative method to ensure the reliability and validity of the study. In addition to this, attempts in facilitating a skype interview with two of stakeholders in India in order to gain deeper understanding did not succeed due to time constraints, which would have elevated further the credibility and validity of this study.

In order to establish larger sample to generalize results on a wider scale all the actual traffic data was collected from 2014 to 2019. Data in the same nature was collected from CAPA in order to understand the situation better and ensure the reliability of the study. The collected data was from globally recognized and widely used companies such as Sabre and CAPA ensuring the reliability and validity of this study. For the literature review, trustworthy resources such as academic articles, professional textbooks, international regulatory and professional websites such as IATA, ICAO or Routes were utilized.

4.4. Process of the Research

This section outlines the research process and how it has been carried out in detail. In the beginning the topic of the research was carefully thought and discussed with the commissioner and supervisors in order to secure that a deliverable research problem is chosen. Senior managers from Finavia's route development team were chosen to be interviewed. The commissioner also suggested to interview Mumbai Airport's route development team in order to understand their perceptions on the route as well.

As for the interview, for each group specific questions were planned to understand their positions and thoughts about the subject in question and gain more insight. As Babione (2015, 125) in her Practitioner Teacher Inquiry and Research –book reflects that descriptive, structural and contrast are different questioning techniques used in interview questions.

Descriptive questions are those questions where the interviewee provides description, examples and share their experience and knowledge related to the matter in question. Structural questions aim to explore on how interviewees manage their knowledge into classifications. In another word, structural questions aim to gain lists of types or steps of terms and understand the relationship among them. On the other hand, contrast questions try to understand the meaning of different items or terms by asking comparisons or differences. (Babione 2015, 125.)

Descriptive questions were used to bring new perspectives and as it was anticipated, it did bring new ideas and insights. In addition to this, during the interviews additional questions were asked if more information was needed. All interviews were recorded for transcription, further analysis and interpretations. Prior to starting the study, in order to maintain the punctuality of the performance throughout the study carefully designed timetable was engineered. Table 4 below summarizes the schedule for this study.

Table 4. Research timetable

Steps	Assignment	Date	Duration	Status
Arrangements with Commissioner	Submitting the application	17.3.19 – 17.3.19	1 d	Completed
	First meeting with the commissioner	4.4.19 – 4.4.19	1 d	Completed
	Research problem identification	4.4.19 – 7.5.19	1 m	Completed
Konto	Submitting the proposal & acceptance	29.4.19 – 6.5.19	1 w	Completed

Designing and planning the research	Research problem identification 2/2	29.4.19 – 6.5.19	1 w	Completed
	Research method identification	26.8.19 – 2.9.19	1 w	Completed
Literature review	Reviewing extensive materials	1.9.19 – 31.1.20	4 m	Completed
Data Collection	Sabre Data set 1	15.6.19	1 d	Received
Data Collection	Sabre Data set 2	24.9.19	1 d	Received
	Questionnaire design and testing	23.9.19 – 30.9.19	1 w	Designed and tested
	Interview	1.10.19	1 d	Completed
	Interview Email	14.10.19 – 4.2.20	4 m	Completed (Answers were delayed)
Data Analysis	Writing the outcomes of the interview	1.10.19 – 8.10.19	1 w	completed
	Analyzing data	1.10.19 – 29.2.20	4 m	Completed
Analysis	Drawing conclusions	1.3.20 – 9.3.20	1 w	Completed
Reviewing drafts for improvements	With the supervisor	9.12.19	1 d	Improved
	With the commissioner	16.1.20	1 d	Improved
	With the supervisor	5.2.20	1 d	Improved
	With the commissioner	19.2.20	1 d	Improved
	With the supervisor	21.4.20 – 12.5.20	2 w	Improved
	With the commissioner	21.4.20 – 12.5.20	2 w	Improved
Final stage	Writing results	21.4.20 – 12.5.20	2 w	Completed
	Maturity test	01.6.20	1 d	Completed
	Submission	right after the test	-	Completed

Although the designed timetable was engineered carefully, due to personal surgical operations and other issues the study was disorganized and delayed for a time period of almost 3 months. This study started on late August 2019 and ended in early May 2020.

5. Research Results

In this section the author presents the results of his research. This part is divided in two main part of case study results and interview results. As a means to have more clear presentation of results first part is divided further into four groups. This includes market analyses where passenger numbers on both direction between Finland and India are analyzed and quantified. After this, author conducted opportunity identification and route feasibility analysis as parts of this case study.

As mentioned before in section 3.2. route development process (figure 5) includes four steps of market analysis, business case and incentives, initiating the route in cooperation with stakeholders after setting objectives for route development. Knowing the market as a destination you are trying to sell to the airline is vital in the route development process. Core components of the market analysis are economic and social indicators, tourism profile, passenger traffic data and air cargo traffic data as summarized in section 3.2.1.

5.1. Case Study Results

In the market analysis understanding the traffic patterns and flows are extremely important. The O&D market data indicates the true size of market and demand of a city-pair regardless of the routing, whilst leg flow data indicates the actual number of passengers who have been sitting in the plane. In the leg flow analysis passengers have been divided into four groups of local, beyond, behind and bridge as reflected in the 3.2.2. section and figure 8 example. Regardless of the routing, based on the data collected from Sabre Global Demand Data the grand total true O&D traffic between India and Finland has been nearly 360,000 passengers from 2014 to 2019 and growing.

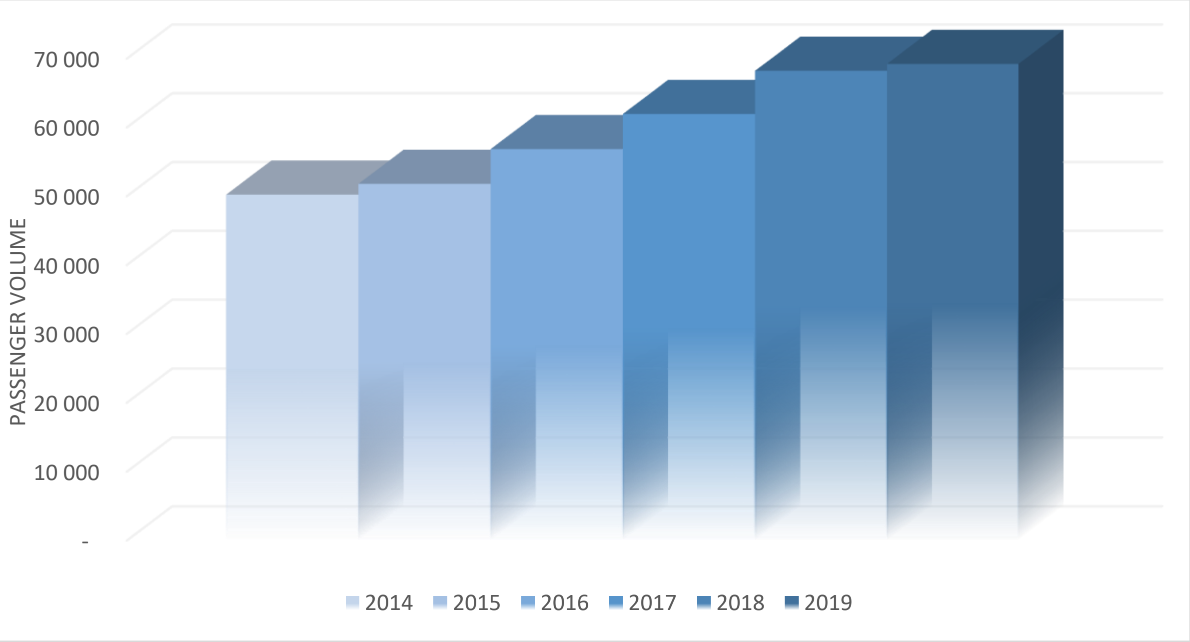


Figure 11. O&D traffic between Finland and India (Sabre Global Demand Data)

The number of O&D passengers between Finland and India grew from 50,000 passengers in 2014 with nearly 20,000 more travelers reaching almost 70,000 passengers in 2019 as portrayed in figure 10 above. The compound annual growth rate for the period of 2014 – 2019 was 12.1%, which means that the number of travelers has been doubled since 2014. In absolute numbers the passenger volume in years of 2014 was 50,220, in 2015 was 51,783, in 2016 was 56,837, in 2017 was 61,939, in 2018 was 68,222 and in 2019 was 69,212. The growth in 2014, 2015 and 2016 were moderate and relatively on low pace. Out of a total of 360,000 O&D passengers between Finland and India over 300,000 passengers have been using HEL on both directions between same years discovered from analyzed leg flow data. This amount includes all four passenger types of local, behind, beyond and bridge.

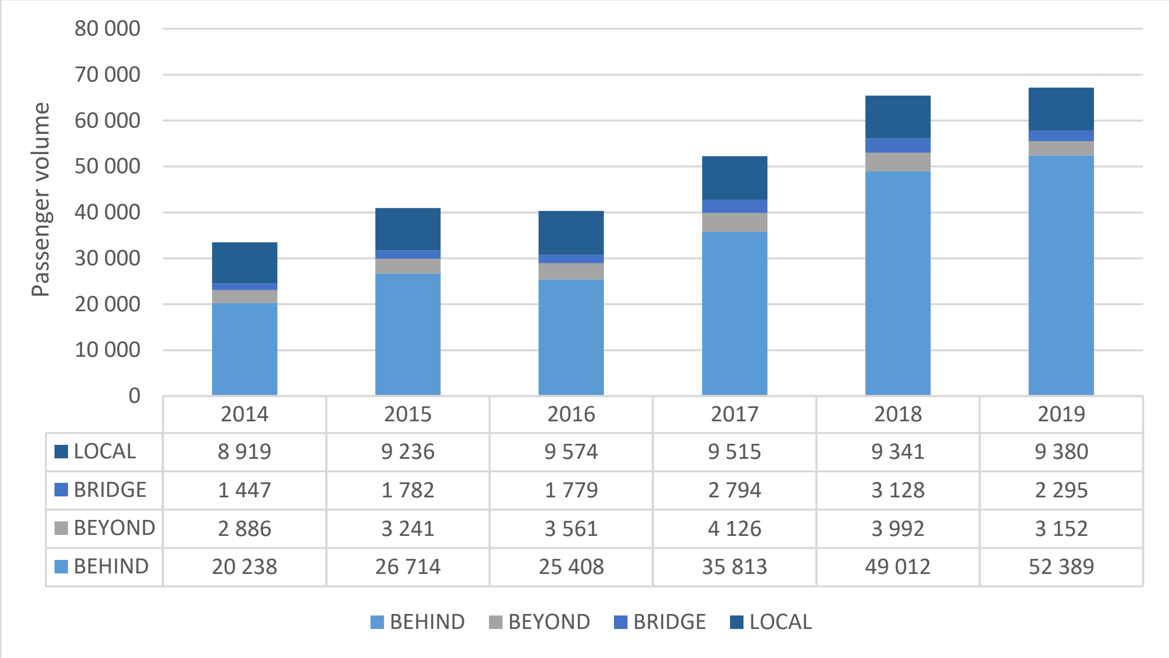
Republic of Finland with population of 5.5 million is a member of European Union situated in Northern Europe neighbored by Russia, Norway and Sweden (InfoFinland 2014). According to the World Bank data, Finland's GDP per capita was over $50,000 in 2018, and data presented by Statistics Finland shows that GDP grew by 1.7% at the same year. (World bank 2018; Statistics Finland 2019a.) A survey done by Finnish Ministry of Finance in 2019, indicated steady growth in the household disposable income and expenditure supported by the higher level of wages and employment rates. Survey also forecasts moderate growth for consumer demand and GDP at the average rates of 1.1% in coming years. (Ministry of Finance 2019, 16-17, 65.)

According to the report published by Statistics Finland (2019b), Finland is one of the world's happiest and the most stable countries in the world. The total demand for tourism was approximately €15 billion and Finland situated at the place of 4th in the world for its sustainably competitive environment. Destinations in Finland are divided into four main groups of Helsinki region, Lakeland, Lapland and Coast and Archipelago each standing for 43%, 17%, 24% and 16% of all foreign nights, respectively. Helsinki airport catchment area includes all the Helsinki area and 4-hour isochrones including St. Petersburg and Tallinn regions networked with Helsinki by all four main transport modes. (Finavia Pricing and Analytics Manager 24.9.2019.)

India is a home to several touristic places located in Southern Asia neighbored by many countries such as Pakistan, China, Nepal and Bangladesh. India's population is over 1.3 billion inhabitants (CIA 2020). According to the International Monetary Fund (IMF), GDP of India will grow with the average of 5.8% in coming years and GDP per capita was over 2000 in 2018 (IMF, 2020.) Mumbai is India's largest city with a population of 23 million people which is expected to be the second biggest urban agglomeration in the world by 2025. As the wealthiest city in India, Mumbai is the center of commercial and financial services, diamond cutting and home to several stock exchanges. With over 13.6 million international passengers, Mumbai is also one of the biggest entertainment hubs with its ''Bollywood' filming industry. (Mumbai Airport Route Manager 24.10.2019.)

5.1.1. HEL – India Leg flow analysis

In absolute numbers, a total of 299,574 passengers flew from HEL to India (IN) during the years of 2014 – 2019. As for this research all passengers are going to the Indira Gandhi Delhi airport (DEL) and then possibly continuing to their final destinations. The grand total passenger numbers of the HEL – India leg are growing steadily including all traffic types of behind, beyond, bridge and local. As the figure 12 shows the traffic between HEL and India has been doubled since 2014 reaching over 67,000 travelers in 2019. As for the airport of HEL, traffic flows of beyond, bridge and local have been relatively small and growing at a slow pace but the main growth has been on the traffic behind the HEL.



	2014	2015	2016	2017	2018	2019
LOCAL	8 919	9 236	9 574	9 515	9 341	9 380
BRIDGE	1 447	1 782	1 779	2 794	3 128	2 295
BEYOND	2 886	3 241	3 561	4 126	3 992	3 152
BEHIND	20 238	26 714	25 408	35 813	49 012	52 389

Figure 12. Passenger volume on HEL – India leg flow (Sabre Global Demand Data)

On the aggregated level, during 2014 – 2019, in absolute numbers the share of local traffic was 55,964, bridge traffic 13,226, beyond traffic 20,958 and behind traffic accounted for 209,574 passengers as the largest traffic share. In 2014 nearly 33,500 passengers including all traffic types travelled to India using HEL airport. In 2015 the volume was 40,973 and in 2016 it was 40,323 indicating a slight decline in passenger numbers as it is noticeable in the above-mentioned figure. The volume of passengers in 2017 stood for 52,248, in 2018 for 65,473 and in 2019 for 67,215 in real numbers.

Passenger volume development for the top 10 origin airports of behind HEL traffic during the period of 2014 – 2019 is displayed in figure number 13. On the aggregated level and in terms of passenger numbers, top 10 behind HEL origin airports on HEL – India leg flow are Stockholm-Arlanda Airport (ARN) with 22,103 passengers, Copenhagen Airport (CPH) with 21,912, London Heathrow Airport (LHR) with 18,591, Oslo Gardermoen Airport (OSL) with 15,032, Amsterdam Schiphol Airport (AMS) with 14,261, Charles De Gaulle Airport (CDG) with 11,504, Gothenburg Airport (GOT) with 7947, Barcelona Airport (BCN) with 6604, Berlin-Tegel Airport (TXL) with 5928 and Madrid Barajas Airport (MAD) with 3526 passengers.

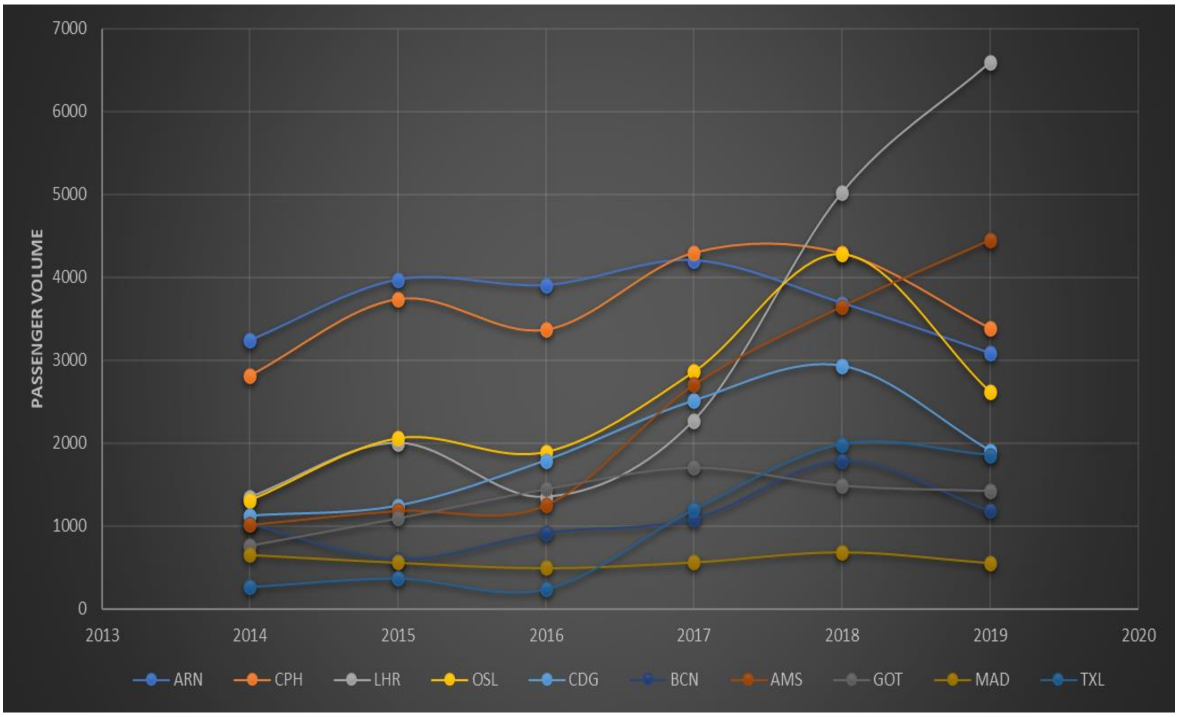


Figure 13. Passenger development of top 10 behind HEL origin airports between 2014 – 2019 (Sabre Global Demand Data)

Among top 10 behind HEL origin airports, 72% of traffic share is divided among ARN, CPH, LHR, OSL and AMS each with shares of 17%, 16.9%, 15%, 12% and 11% respectively. Other airports form the rest 28% of traffic share. In 2019 after LHR, AMS, CPH, ARN, and OSL had the biggest shares in behind traffic to India mainland. In the same year, LHR surpassed other airports with approximately 6600 passengers on this leg flow.

On this leg flow as the passengers arrive in India and DEL airport, transfer passengers will continue their journey to their final destinations which are from HEL's perspective so-called beyond traffic. The traffic development process of the top 10 beyond India destination airports for the period between 2014 and 2019 are shown in figure 14 below. On the aggregated level and in terms of passenger numbers, top 10 beyond India destination airports are Pune International Airport (PNQ) with nearly 7040 passengers, Bangalore International Airport (BLR) with slightly over 2800, Mumbai Airport (BOM) with 2549, Chennai International Airport (MAA) with 2062, Hyderabad Airport (HYD) with 1570, Kolkata Airport (CCU) with 1060, Kathmandu Airport (KTM) with 808, Goa Airport (GOI) with 623, Chandigarh Airport (IXC) with 326 and Ahmedabad Airport (AMD) with 281 passengers.

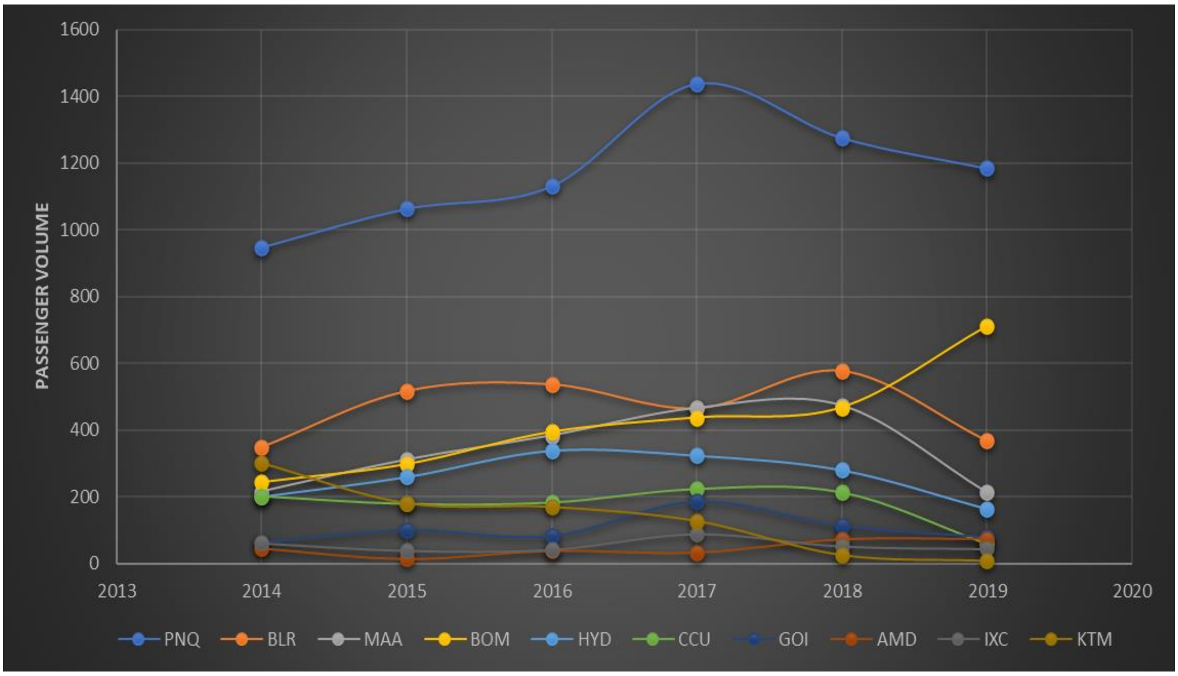


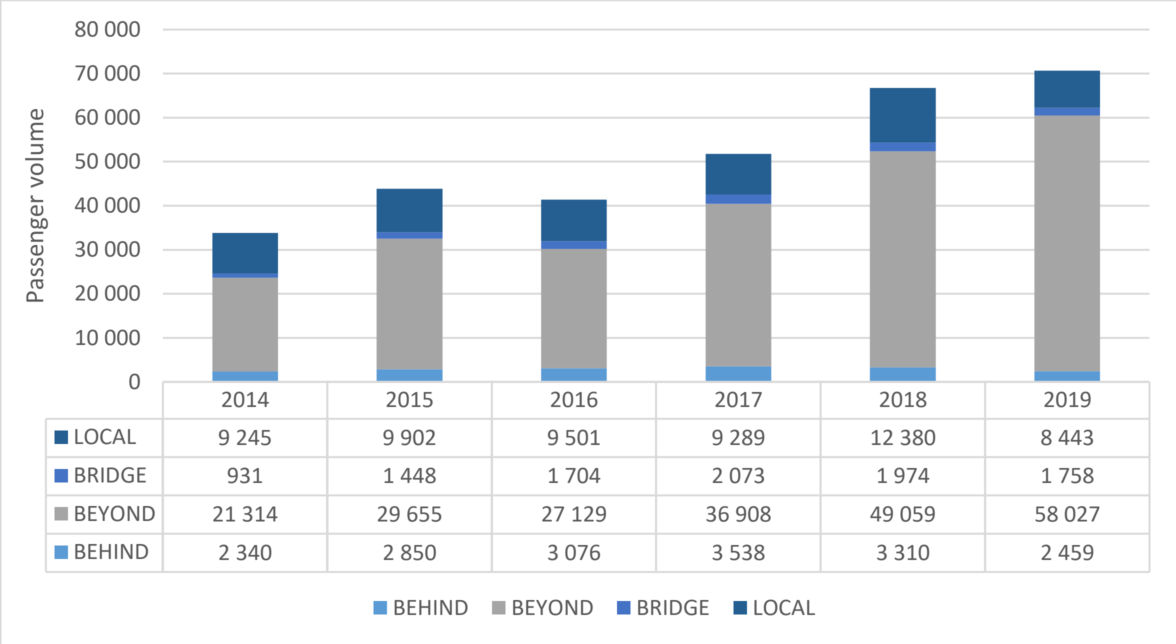
Figure 14. Passenger development of top 10 beyond India destination airports between 2014 – 2019 (Sabre Global Demand Data)

The traffic share of these airports has been cyclical with relatively flatten curves illustrated above. Among the top 10 beyond India destination airports, 37% of traffic share is shaped by PNQ airport alone. Other airports are shaping the rest 63% of traffic share with BLR, BOM and MAA among largest shares each with 15%, 13% and 11% respectively. As figure 14 above points out, PNQ's traffic volume has been the largest throughout these years and it was at its highest in 2017. In the year of 2019, the top 5 destination airports were PNQ, BOM, BLR, MAA, and HYD each with a total beyond traffic of 1184, 710, 368, 213, and 165, respectively. Despite the cyclical nature of traffic and in terms of passenger numbers, the passenger volume of BOM has nearly tripled from 240 passengers in 2014 to over 700 passengers in 2019 displacing BLR and MAA in the same year.

5.1.2. India – HEL leg flow analysis

During years of 2014 – 2019, a total of 308,311 passengers measured in absolute numbers flew from India to HEL airport. As for this research all passengers are going to HEL airport and then possibly continuing to their final destinations. As mentioned before, the grand total passenger numbers on the India – HEL leg flow is also growing steadily including all traffic types of behind, beyond, bridge and local. As figure 15 below portrays, with a slight decline in 2016, traffic between India and HEL has been doubled compared to 2014 reaching nearly

71,000 travelers in 2019. The below figure also shows that most of the growth has been on beyond segment which is the largest among other segments in traffic between India and HEL airport. On this leg, traffic flows of beyond, bridge and local have been relatively small and growing at a slower pace compared to beyond segment. The nature of traffic suggests that the traffic is not directional and there is two-way traffic.



	2014	2015	2016	2017	2018	2019
LOCAL	9 245	9 902	9 501	9 289	12 380	8 443
BRIDGE	931	1 448	1 704	2 073	1 974	1 758
BEYOND	21 314	29 655	27 129	36 908	49 059	58 027
BEHIND	2 340	2 850	3 076	3 538	3 310	2 459

Figure 15. Passenger volume on India – HEL leg flow (Sabre Global Demand Data)

Out of the grand total of 308,311 passengers throughout 2014 – 2019, there were a total of 222,091 passengers flying on the beyond HEL segment, 17573 on behind India segment, 9887 on the bridge and 58,760 passengers travelled on the local segment. On a yearly level, 33,830 passengers including all traffic types traveled in 2014 between India and HEL. In 2015 the volume was 43,855 dropping to 41,409 in 2016 which explains passenger volume decline in 2016. The same phenomenon is visible on HEL – India leg flow (figure 12) as well. Otherwise the passenger volume grew as it accounted for 51,808 in 2017, 66723 in 2018 and 70,686 passengers by the end of 2019.

The development of passenger volume for the top 10 behind India origin airports is illustrated below in figure 16**.** On the aggregated level between 2014 – 2019 and in terms of passenger numbers, top 10 behind India airports are PNQ with 6501 originated passengers, BLR with 2154, BOM with 2017, MAA with 1569, HYD with 1372, KTM with 1263, CCU with 942, GOI with 404, AMD with 335 and IXC with only 254 passengers. From 2014 through 2019, MAA traffic flow has experienced most cyclical traffic compared to other airports.

Traffic share of BOM has been cyclical but relatively stable accounting for second largest passenger share in 2019 after PNQ airport.

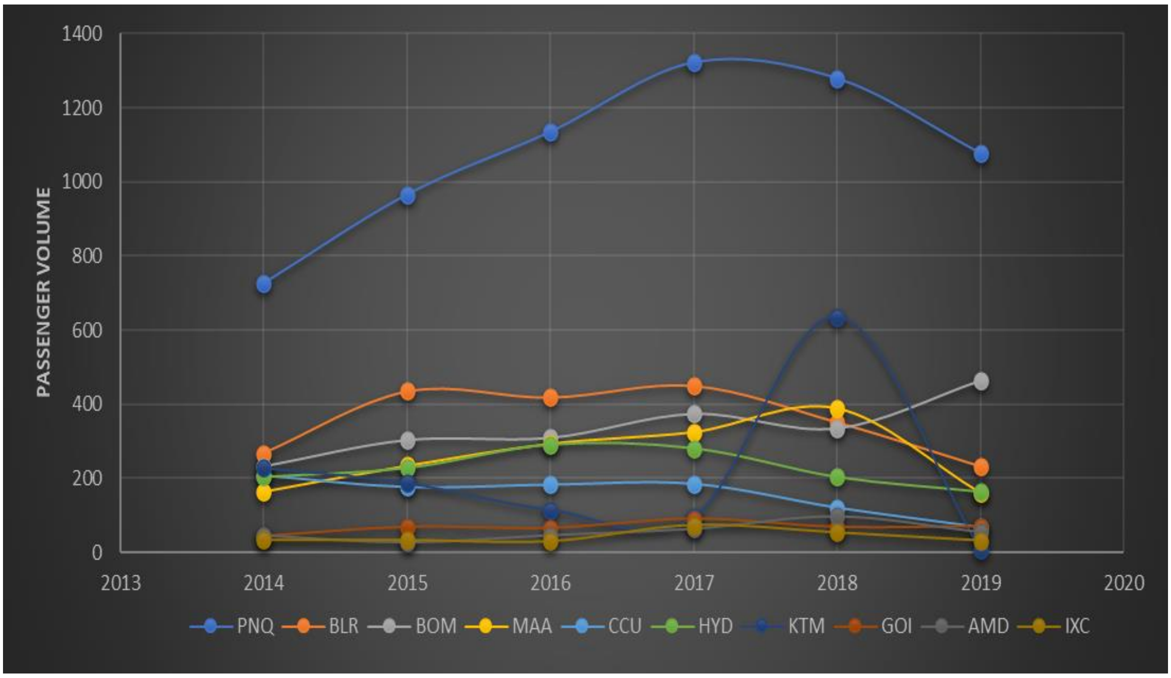


Figure 16. Passenger development of top 10 behind India origin airports between 2014 – 2019 (Sabre Global Demand Data)

Among the top 10 behind India origin airports, 64% of traffic share is formed by PNQ, BLR and BOM airports of which 39% of traffic share belongs to PNQ alone. Correspondingly, the traffic shares of BLR and BOM are 13% and 12%. The other seven airports shape the rest 36% of traffic share on India to HEL leg flow. On this leg flow as the passengers arrive at HEL, transfer passengers will continue their journey to final destinations which is from DEL's perspective called beyond traffic. The top 10 beyond HEL destination airports and how they have developed from 2014 to 2019 are shown in figure 17 below.

On the aggregated level and in terms of passenger numbers, top 10 beyond HEL destination airports from 2014 to 2019 on India – HEL leg flow are CPH with 22,675 passengers, ARN with 21,891, LHR with 19,764, OSL with 15,837, AMS with 14,502, CDG with 10,033, GOT with 8747, BCN with 7574, TXL with 7218 and MAD with 3860 passengers. Despite the fact that the top 10 airports are quite same in the passenger numbers only orders are different according to the segment and leg flow. This indicates that passengers coming from behind HEL and going to beyond India are also going back to beyond HEL meaning there is traffic on both directions where 6th freedom can be leveraged by the airlines.

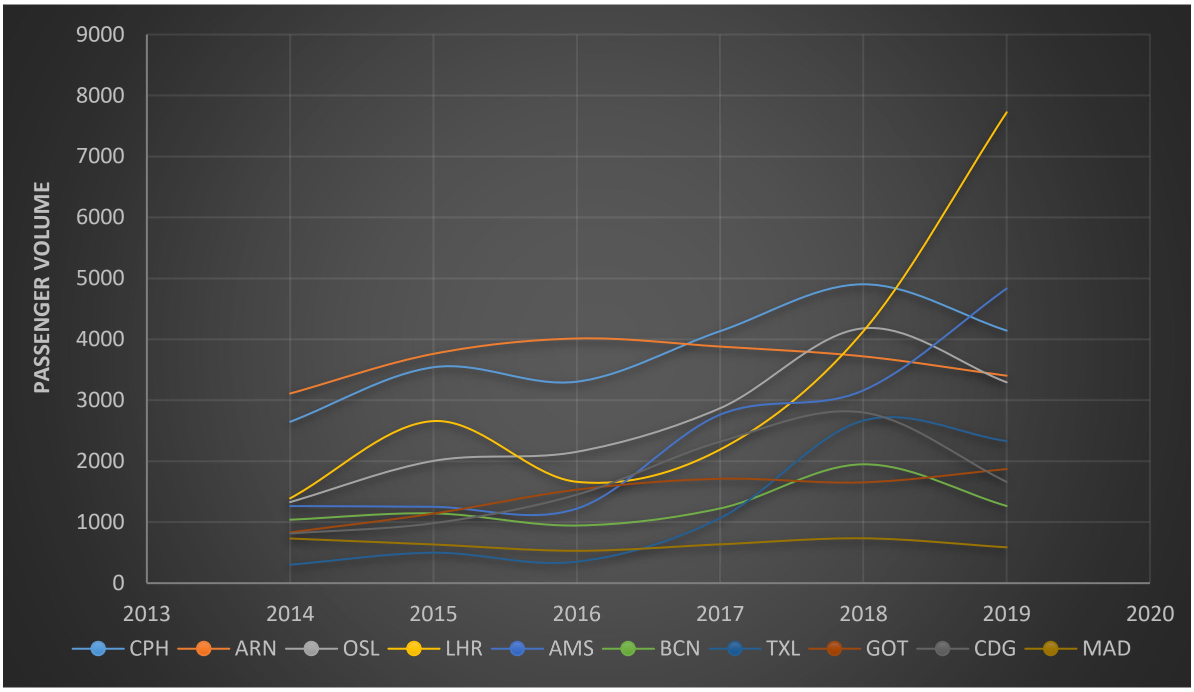


Figure 17. Passenger development of top 10 beyond HEL destination airports between 2014 – 2019 (Sabre Global Demand Data)

Figure 17 above also shows that the traffic share of these airports is cyclical. Between the years of 2014 to 2019 among the top 10 beyond HEL destination airports, 71% of traffic share is shaped by CPH, ARN, LHR, OSL and AMS each with 17%, 16%, 15%, 12% and 11% respectively. Other airports form the rest 29% of traffic share. Figure 17 shows that the traffic share of these airports has been strong throughout the analyzed years. LHR airport with 7725 passengers (25%) had the largest traffic share measured in absolute numbers displacing all other airports in 2019. This was followed by AMS, CPH, ARN, and OSL each with 4834, 4143, 3403 and 3295 passengers, respectively. There are strong similarities between behind HEL traffic characteristics on HEL – India leg and beyond HEL traffic on India – HEL leg.

5.1.3. Opportunity Identification

After market analysis the opportunity identification was undertaken. For opportunity identification four major European gateways London Heathrow Airport (LHR), Paris Charles de Gaulle International Airport (CDG), Frankfurt Am Main Airport (FRA) and Amsterdam Schiphol Airport (AMS) were chosen for analysis purposes. Having the geographical location of Finland in mind, in this part the development of passenger numbers, fares, total revenue and cabin classes via above-mentioned transit airports to the North America region from BOM have been analyzed as to see how many passengers can be captured from those transit airports to use the HEL for traveling to North America region. Results of leg flow analyses and the fact that these are Europe's main gateways contributed to the decision to select them for analysis purposes.

Between 2014 and 2019 over 1,500,000 passengers travelled from BOM with one-stop route to United States (US) and almost 355,000 passengers travelled to Canada (CA) using one of the LHR, FRA, CDG or AMS transit airports. CA is a country code for Canada and US for United States. Figure number 18 summarizes the average traffic shares of these transit airports on the Canada traffic where it accounted for 44%, 25%, 13% and 18% respectively as well as on the United States traffic where it accounted for 46%, 25%, 18% and 11% respectively. The traffic share of AMS airport on US traffic has been cyclical where it dropped from 16% in 2014 to 5% in 2015. However, the AMS airport was able to capture 13% of the traffic share in 2019 once again. Out of main four transit airports, AMS has the smallest market share on the United States market and CDG has the smallest market share on the CA market.

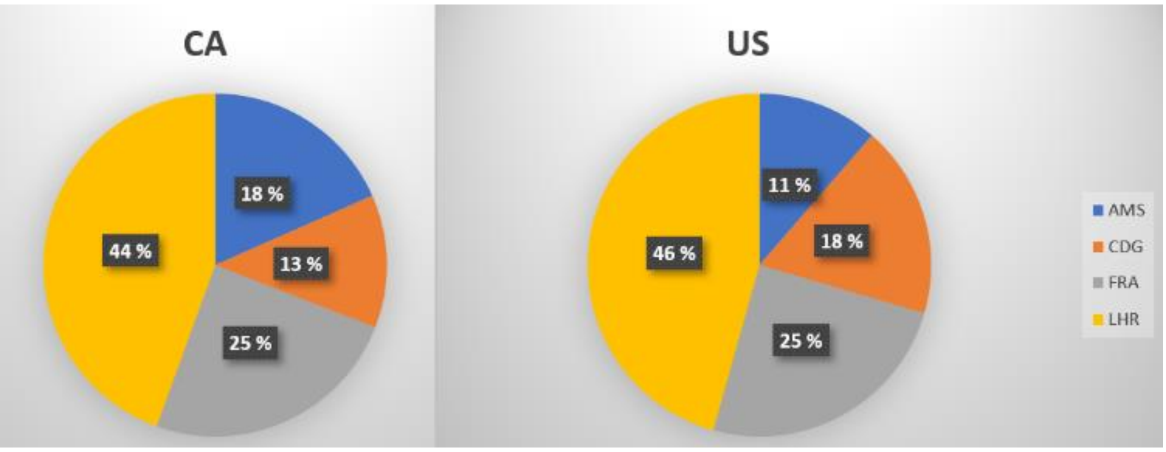


Figure 18. The average traffic shares of transit airports on BOM – US and BOM – CA routes (Sabre Global Demand Data)

Mumbai (BOM) – United States (US) traffic

For this research, the traffic between BOM and United States with one-stop has been quantified since capturing a proportion of that traffic is desired. From BOM to United States, LHR has the biggest passenger share followed by FRA, CDG and AMS in terms of passenger numbers as exemplified in figure 19 below. The same figure illustrates how the passenger numbers have been evolving from 2014 till 2019. The LHR after 2014 with over 165,000 passengers dropped to approximately 100,000 passengers from 2015 through 2017 and after success in capturing larger number of passengers in 2018 it dropped to almost 86,300 by 2019. The development of passenger numbers via FRA has been relatively flat and after 2 years of decline in 2016 and 2017 it has been raising. Passenger numbers of CDG has been doubled in 2018 and 2019 compared to 2014 and 2015. In 2017, passengers travelling via CDG was almost 66,000 reaching its highest since 2014 where FRA had decline in passenger numbers referring to direct competition between CDG and FRA.

Of these transit airports, AMS airport had the weakest performance and its passenger numbers fell to 11,517 in 2015 with nearly 76% compared to 2014. This confirms 5% of the market share mentioned above and since then AMS has been experiencing steady growth. With the exception of FRA airport, the rest three airports experienced a decline in passenger numbers in 2019.

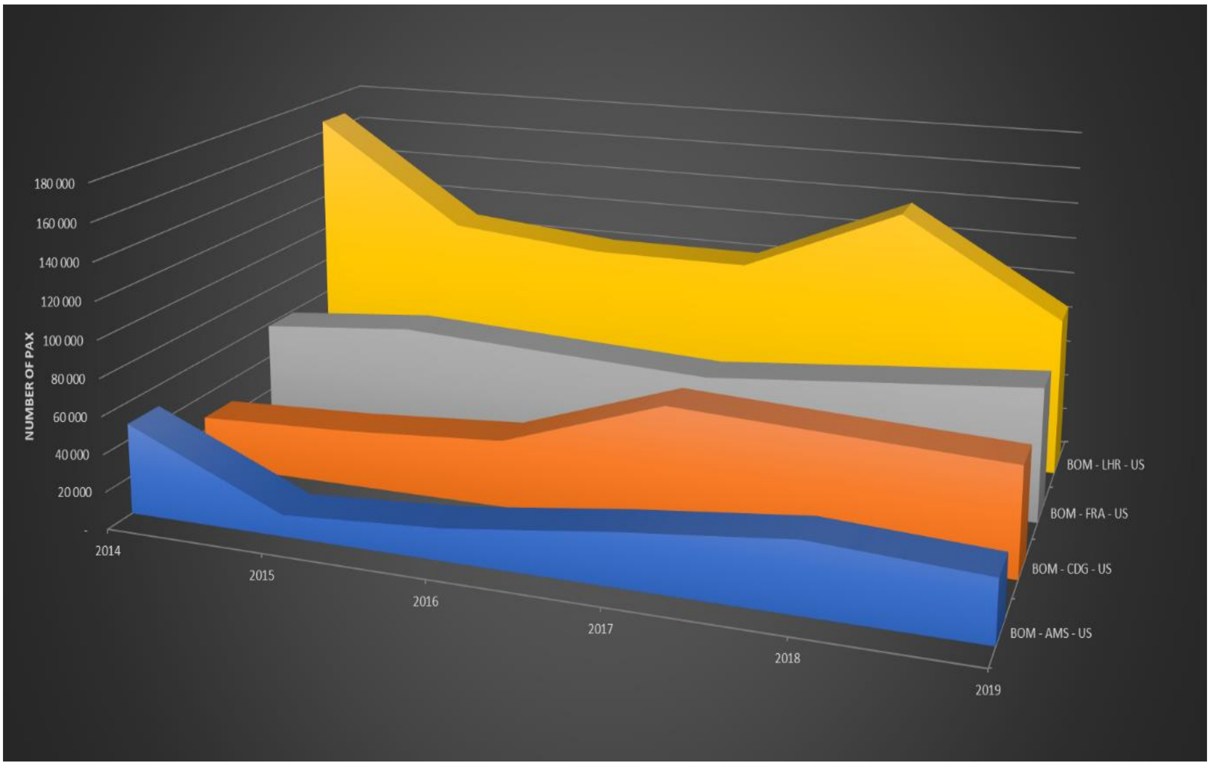


Figure 19. Passenger volume developments of transit airports on BOM – US traffic between 2014 – 2019 (Sabre Global Demand Data)

Table 5 below portrays how fare classes on routes between BOM and US via AMS, CDG, FRA and LHR have been distributed. On these routes four types of Business, Discount Coach, First and Premium Coach are offered. From the table below it is evident that Discount Coach has been the most used fare class type and the number of Premium Coach has been increasing on routes via CDG, FRA and LHR to the United States. In 2014, on the route of BOM to the US via FRA the number of First classes was nearly 722 but fell almost to under 10 and rose back to over 420 in 2019. It is also evident that the Business and First classes are the strongest on the LHR segment.

Table 5. Distribution of fare classes via AMS, CDG, FRA and LHR between 2014 – 2019 (Sabre Global Demand Data)

	CABIN CLASS	2014	2015	2016	2017	2018	2019
BOM - AMS - US	Business	4097	1342	1950	2009	3457	3467
	Discount Coach	44124	10126	15027	25596	33529	28995
	First	0	0	11	38	33	7
	Premium Coach	404	49	91	427	204	0
BOM - CDG - US	Business	3952	5435	5731	7148	6484	5877
	Discount Coach	22247	24005	29371	56839	53687	50515
	First	6	4	9	12	29	53
	Premium Coach	1077	1090	1133	1934	1455	1369
BOM - FRA - US	Business	5987	5435	5731	7148	6484	12663
	Discount Coach	51964	24005	29371	56839	53687	57802
	First	722	4	9	12	29	429
	Premium Coach	0	1090	1133	1934	1455	1380
BOM - LHR - US	Business	17864	14218	15396	16626	25358	22658
	Discount Coach	132207	85707	77462	76813	101383	53350
	First	2513	1731	1219	1227	1796	2466
	Premium Coach	13841	7651	7036	6341	9527	7804

Figure 20 below illustrates both amount of fares and total revenue collected on route of BOM to US via LHR, FRA, CDG and AMS. Fare and revenue collected are in dollars. In figure 20, the Line Chart displays on the right axis represents the fare development over time and the Bar Chart the development of total revenue over time on the left axis. Due to increased competition showed in figure 19 the amount of fares via all transit airports have been decreasing since 2014. The fare of the route from BOM to US via FRA has been the most expensive between 2014 – 2018 and the average fare between 2014 – 2019 has been almost $1600. On an average level, LHR at $1300 had the second-highest fares followed by AMS at $1250 as third and CDG at $1190 as the last one. The level of fares offered via CDG is relatively flat.

Measured in total revenue LHR has indisputably the largest revenue throughout these years as figure 20 below reveals. In 2014, total revenue of this route via LHR was nearly $140 million alone. The large number of passengers travelling via LHR with relatively high fares explains generated high revenue. The average revenue of LHR gateway has been over $83 million on yearly basis. Despite the highest fares sold for the route of BOM to US via FRA, with average revenue of $38 million it had the second largest in total revenues from 2014 till 2019. Even though the total revenue of CDG has been increasing since 2014 it has been relatively flat during these years with the average revenue of over $26 million on a yearly basis. The total revenue of CDG was at its highest in 2017 due to the increase in number of passengers travelled via CDG. Extremely low revenue of AMS traffic in 2015 reflects the low number of passengers captured. In the same year, the total revenue of AMS was slightly over $7.5 million and it was at its highest back in 2014. Despite the strong fall in passenger numbers in 2015, it started to revive resulting in higher total revenue on this route.

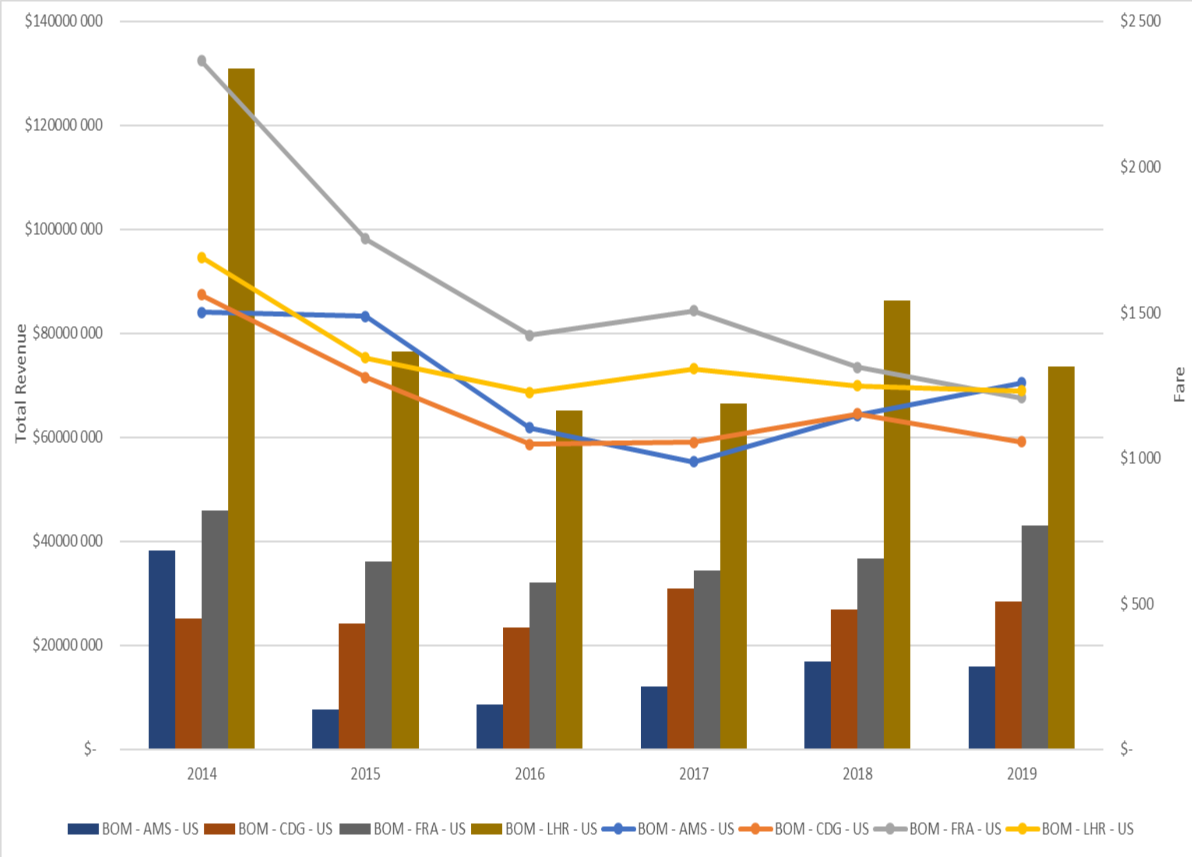


Figure 20. Fares and total revenue development of traffic between BOM and US via transit airports (Sabre Global Demand Data)

Mumbai (BOM) – Canada (CA) traffic

In this part the traffic between Mumbai and Canada with one–stop has been analyzed in the same manner. The same major European gateways have been analyzed. As figure 21 below exemplifies from BOM to CA, LHR has the biggest share followed by FRA, AMS and CDG. The number of passengers at LHR airport between 2014 – 2016 was relatively flat, however, it has been decreasing and dropping to nearly 20,000 passengers in 2019. The development of passengers via FRA has been relatively level and after a small fall in 2017 to 12,287 travelers it has leveled reaching nearly 19,000 passengers in 2019. The traffic share of FRA from BOM to CA has been over 20% throughout 2014 – 2019 reaching 30% at the last year. The strong position of Lufthansa on CA traffic may be one other reason for the growth.

On the traffic between BOM and Canada, AMS has also strong positioning. The number of passengers travelling via AMS in 2015 was the lowest with only 2234 passengers and it was highest in 2018 with nearly 18,000 passengers. The traffic share of AMS in 2014 was 12% and after steep fall in 2015 to 4% it has been strengthened as it captured 28% of traffic out of total passenger traffic travelling from BOM to Canada mainland. The average number of passengers travelling via CDG between 2014 – 2016 was around 4100 and the number has been doubled since then reaching 11,573 passengers and surpassing AMS with nearly 200 travelers. The traffic share of CDG between 2014 – 2016 from BOM to CA out of total traffic travelling was around 7% reaching 19% in 2019.

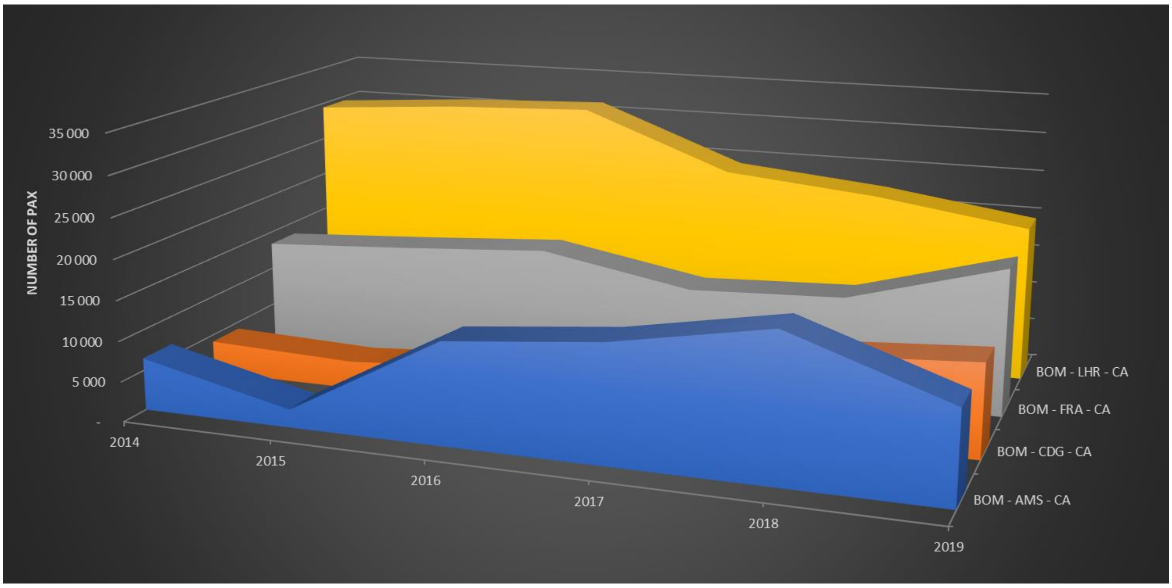


Figure 21. Passenger volume developments of transit airports on BOM – CA traffic between 2014 – 2019 (Sabre Global Demand Data)

Table number 6 below illustrates how fare classes on routes from BOM to Canada via AMS, CDG, FRA and LHR have been distributed. Business, Discount Coach, First and Premium Coach are main four types of fare classes on offer. From the table it is evident that Discount Coach has been the most used cabin class type via all four transit airports with LHR as highest. Due to the low number of passengers on Canada traffic, the number of business and first classes sold are relatively low compared to United States traffic. With LHR having the highest numbers in first-class it worth mentioning that the share of AMS and FRA in business classes are as high as LHR's share.

Table 6. Distribution of fare classes via AMS, CDG, FRA and LHR between 2014 – 2019 (Sabre Global Demand Data)

	CABIN CLASS	2014	2015	2016	2017	2018	2019
BOM - AMS - CA	Business	156	53	1356	1543	1452	563
	Discount Coach	6211	2159	11124	12575	16267	10806
	First	0	0	6	92	98	15
	Premium Coach	149	22	144	275	155	0
BOM - CDG - CA	Business	285	312	448	482	309	400
	Discount Coach	3662	2915	3809	9378	9859	10887
	First	0	0	0	0	1	0
	Premium Coach	178	246	460	427	201	286
BOM - FRA - CA	Business	1399	1546	1795	1575	1288	1476
	Discount Coach	11957	12891	13804	10351	11464	16689
	First	38	19	5	6	5	0
	Premium Coach	0	0	80	356	319	279
BOM - LHR - CA	Business	1809	2063	1634	872	746	1119
	Discount Coach	26333	27865	28770	22430	20593	17480
	First	230	183	84	42	61	44
	Premium Coach	1057	575	870	895	1023	1008

Figure 22 below shows developments of both fares and total revenue collected in dollars on route of BOM to Canada mainland via LHR, FRA, CDG and AMS. In figure 22, the Line Chart on the right axis represents the fare development over time and the Bar Chart on the left axis represents total revenue over time. The analysis of fare development shows that the most expensive fares belong to the traffic flying via FRA with an average fare of $1216 followed by LHR with $1000, AMS with $898 and CDG with $846 representing the lowest. After a fall in fares experienced by all four airports in 2015, they all have remained mainly level throughout analyzed years.

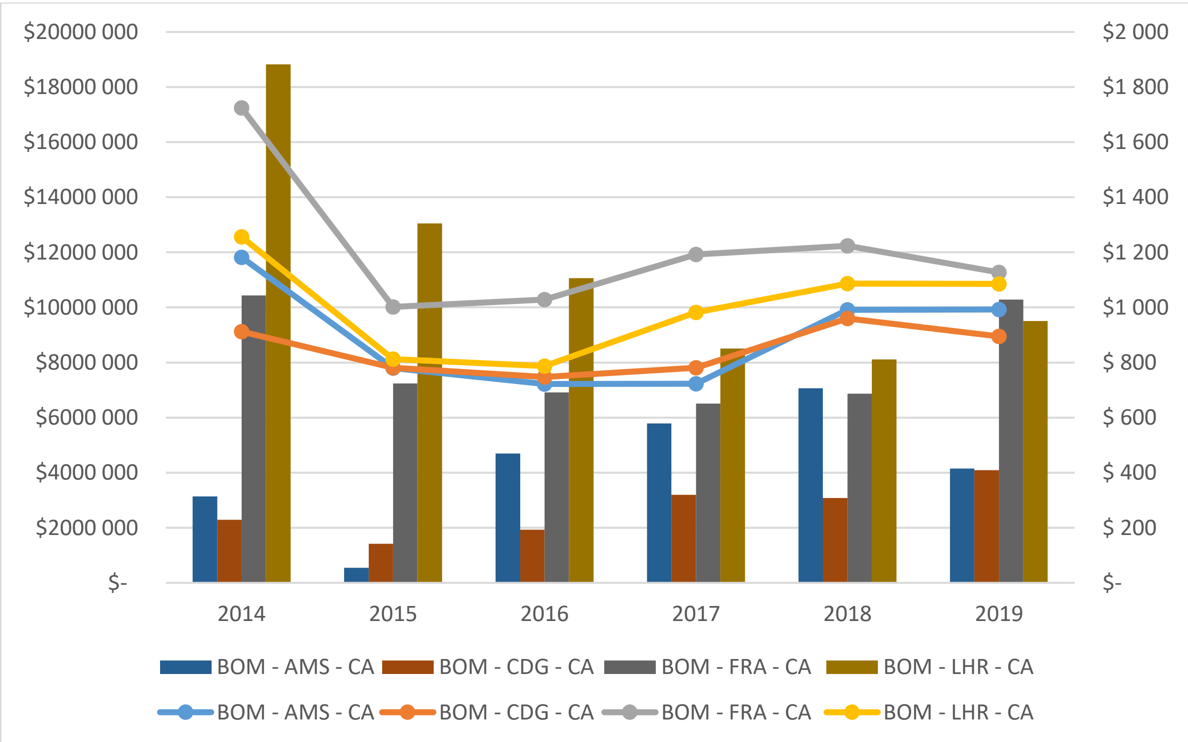


Figure 22. Fares and total revenue development of traffic between BOM and CA via transit airports (Sabre Global Demand Data)

From 2014 till 2019 the total revenue of LHR, FRA, CDG and AMS are $69 million, $48.2 million, $15.9 million, and $25.3 million, respectively. And on yearly basis, the average revenue for LHR, FRA, CDG and AMS are as $11.5 million, $8 million, $2.6 million and $4.2 million individually. As it is displayed in figure number 21**,** high number of passengers travelling via LHR on Canada traffic reflects its high share of revenue. On year-on-year basis, airport of FRA after a fall in total revenue from 2014 – 2018 it surpassed LHR airport in total revenue in 2019. The fall is visible on route via LHR as well. The sudden drop in total revenue for AMS in 2015 despite competitive fares is clear. The total revenue of AMS in the same year was slightly less than $546,000 but it surpassed CDG in the following years. One other reason for the increase in revenue may be the large number of business travelers using AMS on traffic between BOM and Canada. Despite the overall steady growth on the route from BOM to Canada via CDG, the smaller proportion of passengers explains low revenues collected between periods of 2014 to 2019.

5.1.4. Route Feasibility Analysis

For route feasibility analysis both operating cost and revenue calculations were undertaken. In order to calculate an average fare for the route of HEL – BOM, fares of four routes of LHR – BOM, AMS – BOM, FRA – BOM and CDG – BOM from the beginning of the March till the end of October for different trip lengths were analyzed and calculated. For this purpose, fares published on Skyscanner, Momondo, SuperSaver, British Airways (BA), Lufthansa (LH), Air France (AF) and KLM Airlines (KL) were analyzed and calculated average fare for the route of HEL – BOM from all these transit airports was slightly over 670€. Tables 7. and 8. visualize the revenue and operating cost analysis of route proposal in order to get an operating profit estimation of two weekly (two flights per week) non-stop air service on the HEL – BOM route. For this route, an Airbus 330-300 with 300 seats and both business and economy class configuration will be utilized. Aircraft selection is based on analysis done on comparable routes. These calculations are for one full year of operation of two weekly flights. In order to establish two flights per week usually around 48,000 passengers on a local traffic level are needed. However, the market share captured is dependent on many other things. These calculations are not deep financial analysis but in this research the aim is to see the feasibility of the route based on passenger numbers and on simulated operations.

Table 7. Revenue calculation of HEL – BOM route.

REVENUE CALCULATION			
Demand and fare estimates for year	**Annual Demand**	**Prorated avg. OW fare**	**Total revenue**
Total HEL-BOM PAX (both directions)	48000		
Expected market share for two flights per week	20 %		
Local HEL- BOM PAX on new flight	9600	670 €	6 432 000 €
Additional Traffic for both directions			
Behind traffic	34100	620 €	21 142 000 €
Beyond traffic	3000	600 €	1 800 000 €
Bridge traffic	1600	570 €	912 000 €
Total PAX	48300		30 286 000 €
Additional cargo revenue	7 %		2 120 020 €
TOTAL revenue			32 406 020 €

As the competition defines the price between two points, these fares are minimum and assumed based on fares published and historical data. As for the current moment there is no direct flight between HEL and BOM. Due to relatively small local demand of Finland and based on the historical data assumption was made that the expected market share to be captured is only 20% which is equivalent to 9600 passengers on the local level and both directions. On the local traffic level, the total revenue would be over 6.4 million euros.

Due to a relatively small market of local traffic and based on comparable routes such as HEL – DEL, the largest traffic is behind segment and mainly on European destinations. Therefore, the average passenger number is calculated based on the leg flow data and assumed that it will continue to grow in the same way as before. The prorated average fare is also calculated based on published fares and historical data. It is assumed that over 34,000 passengers will travel on behind segments on both directions with an average fare of 620€ making a total of over 21 million euros in revenues on behind segment which is the largest.

Beyond and bridge traffic are among small segments. These numbers are assumed based on historical data of comparable routes. The other reason to assume such passenger numbers was that it was difficult to assume that passengers would fly routes from such as Shanghai or Tokyo via BOM to HEL and via HEL to somewhere else in Europe or North America region. Beyond segment with fare of 600€ and bridge segment with fare of 570€ are making a 2.7 million euros in revenues per year. For the route of HEL – BOM based on assumed passenger numbers and fares, total passengers could be 48,300 on average and total revenue could be 30.2 million euros per annum making passenger revenue per flight nearly 146,000 euros. Additionally, based on gained material, between Finland and India there is around 40 tons of cargo per rotation. For this flight cargo revenue is estimated to be around 7% of passenger revenue which is around 10,000€ per flight in revenue. This flight can make on average and based on assumed different revenue segments make 32.4 million euros in total revenues per annum.

The table below explains the operating cost of a direct flight between HEL and BOM. This flight going to be operated with A330 with 300 seats for two weekly flights. Based on the calculations on great circle mapper webpage the distance between HEL and BOM is 5926 in kilometers and with the average speed of A330, the block-hour from HEL to BOM is estimated to be 8 hours and from BOM to HEL the estimation is around 8.5 hours. Longer westbound flight from BOM to HEL is due to the rotation of earth, wind, and jet streams. The cost of this flight is calculated on three levels of DOC per block-hour, fixed DOC charges and IOC charges. This flight generates 208 annual flights with 286,225,800 RPKs and 369,782,400 ASKs. The total block-hour is 1716 hours for both directions.

Table 8. Operating cost calculation of HEL – BOM route

OPERATING COST				
Inputs and Assumptions			**Calculated measures (annual)**	
Aircraft type	A330-300		Annual Flights	208
Number of seats	300		Total Block Hours	1 716
Total annual flights (each directions)	104		RPKs	286 225 800
block hours HEL-BOM	8		ASK	369 782 400
block hours BOM-HEL	8.5		Avg. PLF	77 %
distance between HEL-BOM(KM)	5926		PAX enplaned	48 300
Aircraft DOC per block hours				
Crew cost	1 350 €			
Fuel and oil	5 988 €		Total DOC	14 860 560 €
Maintenance	1 322 €		Landing charges	629 616 €
total per block hours	**8 660 €**		Handling fees	520 000 €
			Ownership	3 854 400 €
Other fixed DOC charges			Insurance	70 080 €
Landing charges total (both airports)	3 027 €	per flight	PAX services	6 010 742 €
Handling	2 500 €	per flight	Traffic fees	966 000 €
Ownership	440 €	around year	Aircraft services	416 000 €
Insurance	8 €	around year	Promotion and sales	2 422 880 €
			Ground & other genrela costs	2 958 259 €
Items of IOC			TOTAL COST	32 708 537 €
PAX services	0.021	per RPK	**Operating profit**	- **302 517 €**
Traffic fees	20 €	per enplanment	**Operating margin**	**-1 %**
aircraft services	2 000 €	per departure	**CASK**	**0.088453**
Promotion and sales	8 %	of PAX revenue	**RASK**	**0.087635**
Ground & other genrela costs	0.008 €	per ASK	**PASK**	**-0.000818**

These cost assumptions are made based on publicly accessible data such as plane stats webpage for A330 on possibly comparable routes. Assumed average costs for crew, fuel and maintenance are 1350€, 5988€ and 1322€ respectively making total DOC per block-hour 8 660€. Other fixed DOC items are landing charges, handling, ownership, and insurance which are levied per flight and around year. Landing charges are calculated using real fees published by both airports which are based on A330's MTOW. Total direct operating costs including both fixed and per block-hour are nearly 20 million euros.

For this research basic IOC items such as passenger services, traffic fees, aircraft services, promotion and sale as well as ground and other general costs are taken into consideration. Promotion and sales costs are assumed and adjusted to be 8% of passenger revenue and aircraft services to be 2000€ per departure. For passenger services, real fees published by airports are used which include all fees related to passengers paid by airline and it is calculated 0.021€ per RPK. Ground and other general costs include all other ground staff, overhead and cost related to cargo and calculated 0.008€ per ASK. Aircraft services are 2000€ per departure and traffic fees are assumed to be 20€ per passenger making total IOC over 12.7 million euros and total operating costs 32,708,537 million euros in absolute numbers. The average cost of each flight could be over up to 157,000 euros.

Based on the operating cost and revenue calculations, the CASK for this flight is calculated to be 0.088453€ and RASK to be 0.087635€. According to figure 7 (chapter 3.2.2), PASK is calculated by reducing CASK from RASK, and as for this analysis the CASK is larger than the RASK making PASK ultimately -0.00818. Negative PASK indicates that the route is not profitable, and the business case is not good in its own right. According to made assumptions in passenger numbers and cost, this route will operate at an average PLF of 77% generating an operating margin of -1% and operating profit is - 302000€ for this route. This feasibility analysis makes it evident that with these inputs and passenger numbers the fundamentals of the route are not correct, and this business case is not attractive.

5.2. Interview results

Four aviation professionals who are directly involved in route development activities from both Finavia and Mumbai International Airport were interviewed. Table 8 presents details on how interviews have been conducted. The results of the interviews specifically structured according to interview questions. It is worth to mention that questions were specifically designed according to interviewees, so they did slightly deviate from each other.

Table 8. Details about interviews

Organization	Position of interviewee	Method used	Date
Finavia	VP Route Development	Interview in person	1.10.19
Finavia	Pricing and Analytics Manager	Interview in person	1.10.19
Mumbai Airport	Route Manager	Email	14.10.19 - 24.10.19
Mumbai Airport	Analyst	Email	24.10.19 - 04.02.20

Finavia (Helsinki Airport)

Representatives from Finavia agreed that route development has an important role and it is part of their activities to attract new routes to fly to Finavia's airports and generate extra revenue. Depending on the airline's situation Finavia has a different role in the route development process. For example, if the airline does not have any background regarding Finland, then Finavia can affect airline perceptions and decision-making process by sharing data such as Finland's economic indicators, passenger behaviors, historical passenger data and what kind of connections in Finland can be established. Finavia's representatives pointed out that key principles for Finavia Corporation are to increase the capacity and passenger numbers through demand stimulation and without cannibalizing current traffic. Therefore, knowing and understanding the structure of markets and competitions are important in order to avoid negative effects and secure sustainable growth.

Representatives of Finavia also highlighted that even there is no specific threshold for passenger numbers to start a route, it depends totally on many factors such as the nature of the route, the capacity sought and frequency. There is a perception that if the historical data on any pair of cities are already between 20% - 40% of planned capacity, it gives a good starting point for discussion between airport and airline. However, the idea of a route where there is no demand is difficult to sell to the airlines unless LCC or charters are in question.

Finavia does not make a profit-and-loss analysis for the airlines but they have an understanding about the nature of the route and its profitability. However, elements such as length of flight, the aircraft type, passenger profile and the price they are willing to pay are influencing the profitability assessment. It is important to understand that Asian traffic is not fully based on commercial decisions and other governmental decisions need to be taken into consideration – in this case air service agreements (ASAs). Air service agreements between Finland and India are already existing and they are relatively liberal, therefore, any Finnish or Indian carrier can make a commercial decision and start operating. As for the route of HEL and BOM in question, Finavia has a more moderate position.

Mumbai International Airport Limited (MIAL)

Route development has an important strategic position for Mumbai airport. Mumbai airports vision is to become world's best airport and strategic route development is part of it. Mumbai airport believes that route development will improve its seamless connectivity and reach to other countries in the world. As key principles and factors for route development, Mumbai airport is constantly overseeing that routes are not connected directly from Mumbai whereas there is a credible demand for a new route to the new destination.

According to the Mumbai airport the feasibility of long-haul route depends upon two variables of Origin-Destination passengers and passengers from Catchment cities. And according to them, to make such route feasible around 150,000 passengers are needed from both these parameters. According to the representatives from Mumbai airport, despite the fact that Mumbai is the financial capital of India, during the last 5 years the component average growth rate of Mumba airport was only 8.7% but the whole aviation sector of India has grown by over %15. Representatives of Mumbai airport also pointed out that Mumbai airport is on restricted growth and once the Navi Mumbai airport is operational it will serve the excess demand of Mumbai airport and avoid cannibalization of demand of Mumbai airport.

Mumbai representatives also mentioned that demand between Mumbai-Europe is highly strong with over 1.5 million annual passengers and has grown at component average growth rate of 6.8% in last 3 years whereas demand between Mumbai and North America is around 550,000 passengers. Nearly 35,000 passengers travelled between Mumbai & Mumbai catchment and Helsinki in 2018. They also indicated that the route between HEL – BOM would be a viable route with wide-body aircraft, however, according to the author's calculation this route would be at an operating margin of -1% indicating that the fundamentals of route are not right.

The airport of Mumbai believes that the Helsinki connection will help develop traffic between India and Europe without cannibalizing the current traffic of European airlines. However, this route might affect airlines of Middle East that have been enjoying 6th freedom rights and passengers between India and USA. In addition to this, there are various points in Scandinavian region that are not directly connected from Mumbai. They indicate that such route to Helsinki can help reduce major travelling time between these regions.

6. Conclusions and Discussion

It seems that airports have a major role in route development activities as airlines have usually small network development teams. Airports with active and in-person selling methods can affect airlines' perceptions and decision-making processes. Interviews with professionals confirmed that measures such as demand, market size and growth, seasonality, directionality, yields, market segmentation and passenger mix as well as destination appeal and awareness are important for airlines in establishing a new air service. Such measures have an impact on the airline's profitability which need to be discussed as part of their business case. This also confirmed that there is no major gap between route development in theory and practice.

In the beginning and as the leg flow data shows, it is also clear that the traffic between Helsinki and India, in this case Delhi as a connecting point, is growing steadily. So far, the behind HEL segment has been the largest segment for this route showing that transit passengers make this current Delhi flight viable and operational. However, now due to COVID-19 pandemic the nature of the route between HEL and DEL might change fundamentally. The main traffic on this route is European traffic and the number of passengers that are coming from BOM to HEL via Delhi so far is relatively small. Data also shows that the traffic share of LHR on the flight via Helsinki to India is relatively high and is increasing. Data also suggests that the traffic shares of European destinations are growing.

This research aimed to see the feasibility of a new direct route between HEL and BOM. Finnair as a flag carrier and main carrier of Finland is a member of the Oneworld alliance which in term of passengers carried is the smallest. In this route the main focus would be on transit passengers but due to the weak position of the alliance options of passengers to the international destinations, especially North America, would be limited compared to other alliances. Based on the route comparison on BOM to the United States and Canada regions, there is a possibility to capture traffic from analyzed European transit airports.

Despite the assumption that the HEL – BOM route would not only cannibalize the European traffic but also connect various points in Scandinavian and European regions with shorter travelling times. Based on performed feasibility analysis by author, at the moment this route with estimated 48,300 passengers with fare of 570€ to 670€ which are based on published and historical data is making only 32.4 million euros in revenue with negative operating profit. As the competition defines the price, this route does not seem to be profitable at the moment and it is not good business case in its own right due to relatively small demand and the average fare derived from the passenger profile.

One other reason to consider why there is no flight yet, it might be due to the fact that passenger profile might be low fare VFR segment which is not generating enough revenue and is not as profitable as the business profile segment. It worth mentioning that these assumptions are made prior to COVID-19 virus pandemic, and now, it might take years for the situation to normalize where such assumptions can be applicable. This pandemic will change the whole structure of aviation in unknown ways which can make even HEL – BOM route profitable.

The aim of this study was to see whether such route would be feasible based on passenger numbers. The thesis subject was challenging as route development is a complex and demanding process. Besides, due to the unpredictable and vulnerable nature of aviation industry route development was a demanding topic.

The subject of the thesis was extremely interesting regardless of the challenging nature of the study. The author of this study received vital data and information involving route development and historical data from Finavia's route development team. However, delineation of the study led to point not to make suitable airline analysis, business case preparation and too extensive route profitability analysis. Conducted feasibility analysis is based on limited economic parameters but largely based on passenger numbers and simulated operations.

Taking everything into account, the main traffic is transit passengers (behind HEL and beyond HEL) and largely to European and Scandinavian destinations. The conclusion of the route is rather straightforward. With these parameters this route is not feasible, and this evaluation is prior to the COVID-19 virus pandemic. Yet to see if the route parameters will recover from this pandemic or even be profitable at some point.

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Appendices

Appendix 1. Abbreviations

ACI	Airports Council International
AF	Air France
AMC	Aviation Mega-Cities
AMD	Ahmedabad International Airport
AMS	Amsterdam Schiphol Airport
ARN	Stockholm-Arlanda Airport
ASA	Air Service Agreement
ASD	Air Service Development
ASK	Available Seat Kilometers
ASM	Airport Strategy and Marketing
BA	British Airways
BCN	Barcelona Airport
BEG	Belgrade Airport
BLR	Bangalore International Airport
BOM	Mumbai Airport
CA	Canada country code
CAGR	Compound Annual Growth Rate
CASK	Cost per Available Seat Kilometer (unit cost)
CCU	Kolkata Airport
CDG	Charles De Gaulle Airport (Paris)
CPH	Copenhagen Airport
DMOs	Destination Management organizations
DOC	Direct Operating Cost
DOM	Domestic
DXB	Dubai International Airport
EU	European Union
FDI	Foreign Direct Investment
FRA	Frankfurt Am Main Airport

FSNCs	Full-Service Network Carriers
FZ	Flydubai
GDP	Gross Domestic Product
GOI	Goa International Airport
GOT	Gothenburg Airport
HEL	Helsinki Airport
HKG	Hong Kong International Airport
HYD	Hyderabad Airport
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
IKA	Tehran International Airport
INT	International
IOC	Indirect Operating Cost
IXC	Chandigarh International Airport
JU	Air Serbia
KL	KLM Airlines
KTM	Kathmandu Airport
LCC	Low-Cost Carriers
LH	Lufthansa
LHR	London Heathrow
MAA	Chennai International Airport
MAD	Madrid Barajas Airport
MEL	Melbourne Airport
MTOW	Maximum Take-Off Weight
OAG	Official Airline Guide
O&D	Origin and Destination
OSL	Oslo Airport
OW	One-Way
PASK	Profit Available Seat Kilometer
PAX	Passenger
PESTEL	Political, Economic, Socio-cultural, Technological, Environmental and Legal

PLF	Passenger Load Factor
PNQ	Pune International Airport
POD	Point of Destination
POO	Point of Origin
P2P	Point-to-Point
QSI	Quality Service Index
RASK	Revenue per Available Seat Kilometer (unit revenue)
ROIC	Return on Invested Capital
RPK	Revenue Passenger Kilometers
TNA	Jinan Yaoqing International Airport
TV	Tibet Airlines (IATA code)
TXL	Berlin–Tegel Airport
US	United States country code
VFR	Visiting Friends and Family
YoY	Year-on-Year

Appendix 2. Interview Questions for Finavia

1. Could you describe the importance of the route development to Helsinki Airport?
2. What are the key principles and factors for Finavia’s route development?
3. What is the minimum level of PAX from the airport perspective to establish a new route? What are the key factors and tools that Airport (Finavia) has in enabling the high level of PAX?
4. What are the crucial elements Finavia currently takes into consideration while making profitability assumptions?
5. Helsinki Airport charges are lower than many other airports (even in Scandinavia), how do you use this as a marketing tool? How the route development activities are affected?
6. ’Same terms to all customers’’, how this affect the Finavia’s route development?
7. How do you hold onto your market dominance and catchment area? And in terms of air services, how do you think you can expand?
8. What is Finavia’s route development strategy? and based on that, how you are going to connect more with Asian airports?
9. What needs to be considered while simulating demand on long-term?

Appendix 3. Interview Questions for Mumbai Airport

1. Could you describe the strategy and importance of the route development for Mumbai Airport?
2. What are the key principles and factors for Mumbai's Airport route development?
3. Based on your experience, what would be the minimum yearly volume of Pax to make a long-haul route feasible?
4. How does the new Navi Mumbai International Airport will affect your airport and catchment area?
5. What needs to be considered while simulating/forecasting demand on long-term? Key factors affecting the forecasting demand of the route?
6. How would/do you see HEL & Finland as a destination? and Why?
7. Due to short connections between Asia and Helsinki, flying to the US region via HEL is one of the shortest. How other major European HUBs would react to the competition?
8. In your point of view, what would be HEL's/Finavia's strengths and weaknesses for this route?
9. Do you have an airline preference for this route? What are your criteria for evaluating the airlines for the route?
10. Do you have the capacity at your airport for this route?