

# **Benefits of Cargo Based Business Model for an airport**

(Case study Nanaimo Airport, Vancouver Island, British Columbia, Canada)

Ishita Sharma

MA 4 \_URB

Supervisor: Claus Lassen

## Abstract

Air Cargo is an important element of the aviation industry however this aspect is often overlooked. As mentioned by IATA, air trade is responsible for over one third of the world's trade by product value. Delivery of high quality products at competitive prices to consumers worldwide is the key element in the growth of global economy. Although there are a number of challenges to establish a cargo sector within an airport but with thorough research and a strategy this can be worked out which can contribute to the overall economy of the airport.

Nanaimo International Airport, situated in Nanaimo, Vancouver, British Columbia is one such airports that is relatively a very small airport. It is currently undergoing expansion. This airport has observed a growth of 108% in 6 years according to the statistics and hence demands expansion. In order for an airport to perform economically well and currently expanding is cargo a feasible strategy?

## ACKNOWLEDGEMENT

First and foremost I would like to thank my supervisor Claus Lassen for his supervision and support. This helped to frame this report in right orientation. Next, I would like to thank Ole B Jensen for being an inspiration.

I would like to thank Pam Myers, HR Executive and Marketing Manager, Nanaimo Airport, British Columbia, Canada for her time and responses to my queries that helped me to take up this project and work on it.

Last but not the least I would like to thank the *Krisecentre for Kvinder* and my friends –Brian Bodholdt, Desislava Ninova and Ambuj Kumar who helped me, kept me strong and motivated during the toughest times of my life that today I am able to finish my tasks. Without all of them I would have lost long ago.

Ishita Sharma

## Contents

<b>CHAPTER 1</b> .....	6
<b>INTRODUCTION</b> .....	6
<b>1.1 General Introduction</b> .....	7
<b>1.2 Research aim and objectives</b> .....	8
<b>1.3 Research Question</b> .....	8
<b>1.4 STRUCTURE</b> .....	9
<b>CHAPTER 2 Literature Review</b> .....	10
<b>SECTION 2.0 AIR CARGO – CONCEPTUAL ANALYSIS</b> .....	11
<b>2.0 (a) Air Cargo: Conceptual Analysis</b> .....	12
<b>2.0 (b) The Process of Air Freight</b> .....	13
<b>2.1 Modern Air Cargo</b> .....	14
<b>2.2 Analysis of the Air Cargo Market</b> .....	15
<b>2.3 Market volume of Air Cargo</b> .....	15
<b>2.4 Impact of Cargo Operations on Departure and on-time performance</b> .....	16
<b>2.5 Choice of Airport</b> .....	16
<b>2.6 Law and Regulations of Air Cargo</b> .....	17
<b>2.7 The Business Case for Air Cargo</b> .....	18
<b>2.8 Characteristics of Air Cargo</b> .....	19
<b>2.9 Global Air Cargo Operations</b> .....	20
<b>2.10 Comparison of 2017 and 2018</b> .....	21
<b>2.11 Specialized Air Cargo</b> .....	28
<b>2.12 Air Cargo Business Plan</b> .....	29
<b>2.13 Airport air cargo facility design and planning process</b> .....	31
2.13 (a) Design standards of air cargo facility .....	31
<b>2.14 Air cargo related use of land and requirements access</b> .....	32
<b>2.15 Operational/Financial considerations</b> .....	33
<b>Security</b> .....	33
<b>Environmental</b> .....	33
<b>3</b> .....	35
<b>METHODOLOGY</b> .....	35
<b>3.1 Positivism Philosophy</b> .....	36
<b>3.2 Semi Structured Interviews</b> .....	36
<b>3.3 Deductive Approach</b> .....	37

3.4 Co-relational analysis .....	37
3.5 Content analysis .....	37
3.6 SWOT Analysis .....	38
3.7 Explanatory Design.....	38
3.8 Research Design .....	39
3.9 Limitation of the study .....	39
CHAPTER 4 .....	41
4.1 .....	42
4.2 Background and Past Trends .....	42
4.3 Present Strategies of the Government .....	44
4.4 Market Opportunities .....	45
4.5 Analysis of the existing strategies .....	46
4.6 Nanaimo Airport's Geographical Location .....	48
4.8 Analysis of Business model of Nanaimo airport .....	49
4.9 Competition and Competitive Responses .....	50
4.10 Strategic Plan For Nanaimo airport .....	51
Political problems .....	55
Climatic problems .....	55
Undercapitalization.....	56
Lack of leadership .....	56
Aviation security risks .....	56
Risk from Technology limitations.....	56
Inventory policy .....	57
5.1 Conclusion .....	58
5.2 Future Research.....	59

# CHAPTER 1

## INTRODUCTION



*AIR CARGO: "Air cargo is any property carried or to be carried in an aircraft. Air cargo comprises air freight, air express and airmail." (Wikipedia)*

## 1.1 General Introduction

Air Cargo is an important element of the aviation industry however this aspect is often overlooked. As mentioned by IATA, air trade is responsible for over one third of the world's trade by product value. Delivery of high quality products at competitive prices to consumers worldwide is the key element in the growth of global economy (Merkert, Van de Voorde and de Wit, 2017). Goods such as vaccines and other pharmaceuticals that are temperature-sensitive are transported through airlines helping to curb many deaths across the world (Feng, Li and Shen, 2015). According to Rincon-Garcia, Waterson and Cherrett (2018), air cargo transports are connecting cities and regions to the distant markets to develop the speedy global supply chain. However the cargo aspect within an airport is often neglected. This case is more observed in the development of small airports where the entire focus is put on the passengers and hence the development is done keeping in view this aspect. Although there are a number of challenges to establish a cargo sector within an airport but with thorough research and a strategy this can be worked out which can contribute to the overall economy of the airport.

Nanaimo International Airport, situated in Nanaimo, Vancouver, British Columbia is one of such airports that is relatively a very small airport. It is currently undergoing expansion. This airport has observed a growth of 108% in 6 years according to the statistics and hence demands expansion. The state government noticing its growth has released funds for the airport's development. This investment will be for the first phase of the terminal building expansion. This will include expansion of the departure lounge and passenger security area as well as increased services. (thetimescolonist.com) but there is no focus on investing or building the cargo infrastructure in this airport. The airport presently holds almost no air cargo. Hence in order for an airport to perform economically well and currently expanding is cargo a good strategy?

The main aim of the study is highlight the points that prove if it is feasible to have air cargo for Nanaimo airport. There are numerous advantages of air cargo, there are numerous problems and the airport needs to consider all the factor to understand the feasibility of air cargo. With the literature study and appropriate methodology this studies tries to explore the same.

## 1.2 Research aim and objectives

The main objectives are:

- To study the literature and the global air cargo industry.
- Understand the business case and business plan of air cargo
- To analyze the effective of the cargo model
- To examine if it will be effective for the Nanaimo airport to shift from its traditional model to of aviation for passengers to the new cargo model.

## 1.3 Research Question

The major problem of the study is to find out whether it will be beneficial for Nanaimo Airport to shift its focus towards the air cargo. Considering the present business model of the airport is it feasible and effective for the Nanaimo airport to adapt a cargo strategy and invest in the same?

## 1.4 STRUCTURE

This report has been structured into *five chapters*. The *first chapter*, Introduction, gives a brief about the purpose of opting for this study. This chapter defines the problem and the research question.

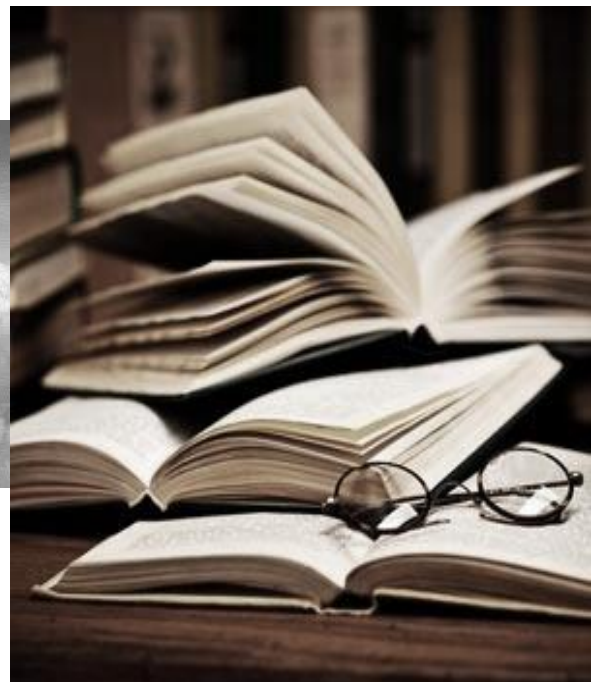
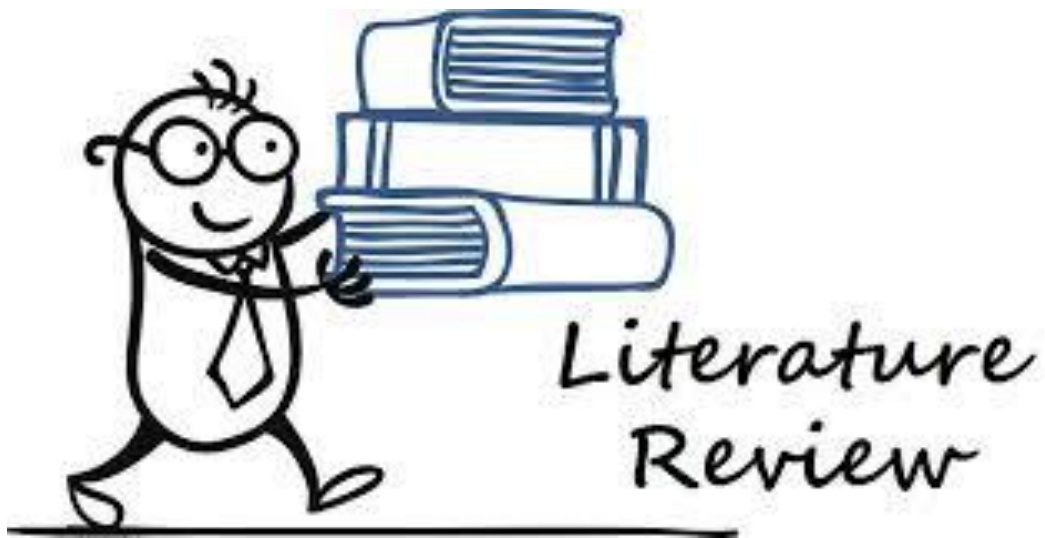
Followed by introduction comes the *theoretical framework* in which the relevant literature has been studied. The literature revolves around air cargo, transport geography and Business Plan of Air Cargo.

In *chapter three*, the research design and methodology has been explained. The quantitative data has been collected from secondary sources which were accessible whereas qualitative data has been collected through interviews, questionnaires, and structured interviews carried out virtually (skype). Furthermore, it is highlighted how the project has been progressing. The hindrances and limitations that occurred along the way have been mentioned.

*Chapter four*, analysis, is written based on the theories discussed in the literature review, quantitative and qualitative data. This chapter further analysis the past trends of air cargo in Canada with main focus on air cargo in British Columbia. An analysis of how top five air cargo airlines operate in British Columbia is made and Business model of top most has been studied. The present business model of Nanaimo airport has been analysed and it is concluded whether it is beneficial for the airport to invest in cargo. A strategic plan has been suggested.

*Chapter five* concludes the findings and summarises the report. It mentions about the scope of future research in this field.

## CHAPTER 2 Literature Review



## SECTION 2.0 AIR CARGO – CONCEPTUAL ANALYSIS

*(The following section is taken from a part of previous self-work, Semester Project Report, Wings to Wheels. Since this part of literature has already been reviewed and connects well to this report, therefore it is included.)*

## 2.0 (a) Air Cargo: Conceptual Analysis

*“Air Cargo is conceptualized as the carriage of goods and commodities in an aircraft. Scott and Trimarchi (2017) explained that air cargo are generally defined into two segments, such as airmail and air freight. Air freight is a parcel delivery services through an air carrier, which may be commercial or charged. This type of shipment travels out of passengers and commercial aviation gateways to anywhere across the world. According to O’Kelly (2014), air freight shipping option helps in creating valuable opportunity to coordinate time sensitive shipments for the customers all around the world. The small and medium sized companies can generate benefits from such services while participating in the international trade with much efficiency. Shipping through the Airways sometimes becomes advantages in terms of maintaining security since the cargo control is highly managed. Apart from the air shipping, some other processes like rail, air ground, marine and freight became the widely utilized mediums for the shipping services (Air Cargo World 2018). At the beginning of the twentieth century, these mediums became the central delivery options for the exporting and importing services. Eventually, the industry started expanding the trade networks both nationally and internationally in an efficient way.*

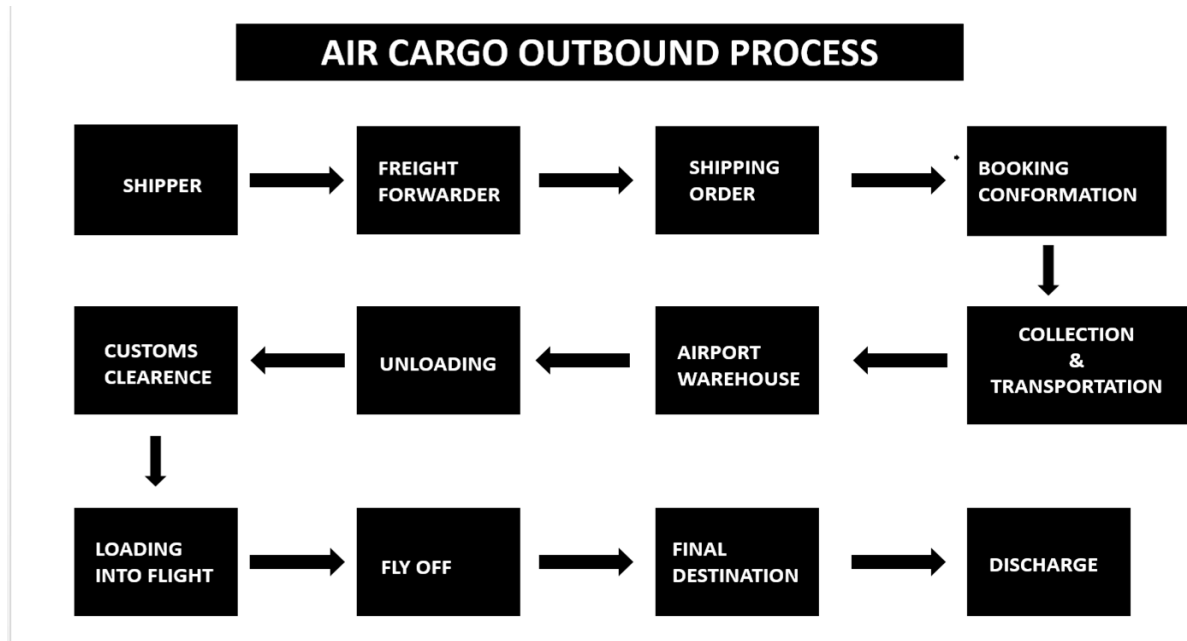
*The air freight segment holds the most of the market share, especially during the forecast period. The rapid development in establishing the cargo hubs as well as the rapid growth of the e-commerce business model is supposedly driving the growth prospects in the air freight process. It is predicted that the global air cargo market is estimated to reach up to US\$130.12bn by the end of the year 2025. Boonekamp and Burghouwt (2017) recognised that the air cargo industry is now complied with new policies and strategies that ensure growth in this market. For example, an international policy called ‘Open Skies’ that demands for the liberalization of the associated rules and regulations in the aviation industry (Beifert*

2015). It has been observed that this specific policy has created greater impact on the air cargo industry.

*The aircrafts are divided into diverse sections, such as passengers, cargo, and combi-aircraft. Among these sections, it has been observed that the cargo aircrafts are generally used for carrying parcels and carrying the freights for side loading. It is noticeable that the aircraft passengers are quite different to the cargo aircraft. Combi aircraft, on the other hand, carry the commodities by side loading on the main deck. In the year of 2013, Cargo airlines in the European Union took the cyclical upturn and considered the significant improvements in the profitability level. However, the negative effects of the entire global recession in 2007/2008 impacted negatively in terms of freight tonne-kilometres (Trzepacz 2014) “*

## **2.0 (b) The Process of Air Freight**

*Air cargo airlines and airlines which carry a portion of freight traffic contribute to the larger courier service industry, which, simply put, delivers messages, packages, and mail. Air freight is a small portion of a much larger logistics networks which involve production, packaging, material handling, inventory, transportation, warehousing, security, and information flow. In the supply chain, customers include end–consumers, retailers, and businesses. These customers contract logistics to shippers, forwarders, or integrators who then select relevant modes of transportation to ship the good. Modes include air, water, and ground transportation. Air cargo becomes a small link within the overall chain. The end package then becomes delivered to the consignee. As a form of transportation, air freight remains just one option out of many. In fact, the growth of the air cargo industry resulted in contributions to the trucking industry, because air freight often feeds into regional trucking as the end mode of transportation. There are different characteristics in terms of operations, delivery, and economy.”*



## 2.1 Modern Air Cargo

Air Cargo is one of the most important and swift source of modern freight movement. In spite of its smooth accessibility and swift transportation facility, the following sector has not been a primary source of business operations. The industry has shown either a negative or gradual growth since its inception (Merkert and Alexander 2018). However, the slow rise of the industry in the last few years have compelled the management of the business organizations to try out Air cargo facilities. The modern day air cargo system is ruled by the presence of specific and dedicated Cargo aircrafts. Apart from the dedicated set of cargo aircrafts, the passenger aircrafts are also utilizing their belly space to carry cargo and other goods to ensure healthy revenue. Reports suggest that almost 50% of the air cargo is carried by the passenger airlines globally. The presence of multinational companies like Fed Ex, DHL, TNT, UPS have changed the way the cargo is transported across the globe. The emergence of the dedicated air cargo service provider companies in the last few years have helped in the growth and expansion of the business enterprises. Companies like Boeing have pushed the production of aircrafts like 767P ordered by Air Cargo movement companies. The increase in the rise of the orders indicates the increase in the service of the Air Cargo facilities globally.

## **2.2 Analysis of the Air Cargo Market**

Air cargo market is seen to be consisting of the revenue that is generated by the transportation of goods through air. The units of volumes are generally measured in freight ton kilometers. The value is represented by the revenue obtained by the revenue obtained by the different kind of the Airline companies. The Air Cargo Sector has grown at a moderate pace in the historic period overall. However, the uneven growth of the following sector and the popularity restricted to the Asia-Pacific zone of the globe has limited its growth overall. A revenue share of around \$116,423.4 million in the year 2017 was considered in the calculation of the revenue growth. The huge figure indicated a growth of close to 5% in the years in between 2013 to 2017. As mentioned earlier, the Asia Pacific region is the leading area of global air freight business and most of the cargo movement which accounts for 43% of the total movement around the globe is carried out in this particular area. The largest growth in this sector can be seen in China and India (Matsumoto and Domae 2018). These two countries accounts for a large portion of the total air cargo share. The level of volume consumptions have also seen a decent rise in the last few years which has helped to ensure the increase in the economic prowess of countries like India and Indonesia. The absence of proper domestic as well as international freight operations in countries like Canada and Russia have made them lag behind in the Air Cargo race. It has been predicted that by the year 2022 the Asia-Pacific and the US sectors will experience a rise of 6.8% and 6% respectively which will help to make the Air Cargo market of these two countries reach to \$68,396 and \$21,790 respectively.

## **2.3 Market volume of Air Cargo**

The industry wide Freight Tonne Kilometres FTK growth started in the year 2019 and ended last year on a soft note. The Air Cargo volumes in the month of January were 1.8% lower than the same level just a year ago. This meant that the negative growth continued for a term of three months (hsdl.org 2019). The industry experts of Air Cargo have predicted a dynamic rise in the growth of the organization. However, the decline of the growth in the last 12 months has questioned the creditability of such a prediction. The global air cargo sector grew by more than 10% in the last year and has reached to a whopping value of nearly \$120 billion. The compound annual growth rate of the following sector was around 5% overall (hsdl.org 2019). On the other hand the air freight sector grew close to 10%

globally and stood at a total of 197.3 billion FTK (Matsumoto and Domae 2018). The international air cargo service is the largest segment in the global air freight sector. It stands at nearly 84% of the following industry volume. On the other hand the domestic sector is just around 20% of the total in the following industrial sector.

## **2.4 Impact of Cargo Operations on Departure and on-time performance**

The management of Passenger Airlines has been trying to make the most of the opportunities over the last few years by means of providing space in the belly of the aircrafts in order to transport cargo. The presence of full time service carriers, low cost services and the dedicated freight service carriers have helped in the growth of the air cargo sector globally. The mixed business models carried out by the aircraft carriers are totally new and have been quite successful in the market (Gardiner Ison and Humphreys 2005). The figures show that around 50% of the air cargo movement is carried out by the passenger airlines company. The cargo market is focused on three different types of carriers. This includes the likes of; all-cargo airlines, combination carriers and integrators. The integrator airlines companies tend to focus on the express market and also provide door to door services that include truck deliveries apart from the regular air transport facilities (hsdl.org 2019). Studying the airline business models independently of each other indicates that there is no interrelation between the two types of operations, i.e. that there are no trade-offs between the two businesses. Air cargo is not only a potential stream of revenue for combination carriers. It also requires the airlines to develop different type of processes to easily handle both passengers and cargo at the same time (Gardiner Ison and Humphreys 2005). In comparison to pure passenger airlines, combination carriers face more complex loading operations at the airport. Any disturbance in the loading process of air cargo may delay the aircraft's departure. As such, cargo operations potentially influence the passengers' travel experience. Similarly, all disturbances from passenger boarding and baggage handling impact on the on-time performance of the transported cargo.

## **2.5 Choice of Airport**

The choice of airport is one of the most crucial choices in this sector. Long term forecasts from two of the largest Aircraft makers namely Boeing and Airbus have shown different kind of prediction results. According to the study of Gardiner Humphreys and Ison (2005) the average annual growth rate for the air freight tonnage has been considered to be

5.5% and 6.4% respectively by both the companies. The rate has been predicted until the year 2021. The overall trend on the other hand has shown a large and stable growth of the companies operating freight carrier services and has predicted a fast and accelerated rise of the dedicated freight cargo (Gardiner Ison and Humphreys 2005). The rise in the growth of the organizations has led to a race for the companies operating in this particular sector to get the most of the market share. The choice of the airport is basically dependent on three major factors. The factors of airport choice include location, air freight demand in the airport of choice and finally the influence of the third party. Locational choice is one of the most important among the main choices of the airport as because location often attracts the freight companies because the management of these companies often assesses the importance of the accessibility of the airports in terms of different kinds of operational restriction and the quality of the airports (Gardiner Humphreys and Ison 2005). The term location is used not only to analyse the geography of the airports but also looks at the influence of the local demand, weather, operational preparedness and many other similar factors. The presence of all these resources in a proper and effective manner is utmost essential for the freight service organizations. The freight service organizations thus ensure to choose airports that have a steady market in close proximity and a high demand for different kinds of goods. Apart from this the presence of a stable economic market is also one of the major considerations for the establishment of cargo hubs by the management of the air cargo companies. The absence of hostile weather and environment conditions can also act as a positive note for building and establishment of a proper Air Freight hub.

## **2.6 Law and Regulations of Air Cargo**

According to, Abeyratne (2018) the international Civil Aviation organization is the specialized agency created and operated by the United Nations in order to look after the different kinds of the operations of International Aviation. The loss of carrier and damage caused to international air freight is contained in Article 18 of the Warsaw convention, which provides that the carrier is liable for the destruction or loss of a damage to the cargo by air for the period during which the goods are in the charge of the aircraft company (Abeyratne 2018). The proposed future regulatory arrangements include the 4<sup>th</sup> ICAO Air Transport Conference guidelines. New guidelines will be implemented as per the demands

of the market. Some of the essential guidelines and safety nets that need to be implemented include;

- a. Regular carriers and non-scheduled carriers need to be included in the system of air cargo movement
- b. To be intended to last for a maximum period of 1 or 2 years which is considered as the most finite period
- c. To be responsible for creating a situation in which any affected party may employ an appropriate dispute resolution mechanism to identify and seek to correct any underlying problem.

Though there have been problems with Air Cargo growth in the last few years, the absence of any kind of positive growth in the business has been a negative factor for the business. However, there have been reports of change in the overall picture as new models of business are being adopted by conventional and traditional passenger airlines. The management of these airlines have started to carry cargo as extra forms of luggage to increase their revenue. The security, accessibility, fast processing and high reliability makes Air Cargo as one of the best choices for the modern business enterprises to carry out global trade in the highly globalized and competitive market. The report has also defined the need to select the perfect venue for the establishment of cargo hubs as the selection is one of the many different factors that helps in the expansion of the air cargo business.

## **2.7 The Business Case for Air Cargo**

Air cargo, as defined earlier, is any property that is carried in an aircraft and includes air freight, air express, and airmail. According to Dresner and Zou, the business case of air cargo includes-

- *“The time value of money*
- *The value of centralized distribution*
- *The value in certainty and the reduction in delivery time variability*
- *The value of security and mitigation of loss”*

Shippers should consider this an investment cost on stagnant goods in transit and the perishability of a product. This shows the length of time that a product takes before it is destroyed (Graham and Halpern, 2018).

Most distributors value the time preference of money hence will come up with measures to ensure that retailers are able to get their products on time and satisfy their demand to avoid them moving to other places or finding other options. They come up with centres for distribution in which it is the shortest and effective for retailers to receive their goods.

Therefore the centralized distribution helps the company to operate with minimal inventory and low warehouse costs, which enables various groups of retailers to save capital and other expenses (Halttunen, 2017). Also, it allows time-saving while shipping new fashions of a product. The major disadvantage of the decentralized system is although it could be the fastest in delivering goods when there is a change of products, the goods may still be on shipping.

Reducing the variation in delivery time is critical since it leads to saving time as well as costs on inventory (Barz and Gartner, 2016). For example, an individual would most prefer to use air transport and not sea due to the time taken in order to receive the goods than waiting for so long thus maintaining customers, increasing ones market and creating customer confidence.

Security is a significant concern for any business person. Due to globalization, products are being transported to various destinations with increased distances; hence, they can be mishandled, lost, or dropped when transported by sea. Transport via air is costly, but goods are safe, remain in good quality, and cannot be misplaced or stolen as in the case of piracy in the sea (Olariaga, 2018).

## 2.8 Characteristics of Air Cargo

Since airline travel is common majorly for long distance traveling for both passenger and freight travel and reasonable when time is put into consideration. It has various characteristics, first is high speed (Brandt and Nickel, 2018). Air transport does not face any traffic jam as it follows a specific time table and route as a set. Goods are quickly delivered as it takes a short period to arrive, and an individual can pick.

Moreover, air cargo has high security since goods are carried under specific conditions and containers, thus reducing the chances of risk of damage to the products. Because of its safety, being accurate and insurance costs tend to be lower.

Also, high punctuality of air transport. Due to the fixed schedule and traveling table of movement, goods can arrive on time, and customers can pick within a shorter period. The transaction is well enhanced with the help of well-formulated schedule; thus customer satisfaction fulfilled when they get the goods within a short time.

Air transport can sale internationally hence encouraging importing of goods globally and exporting from one country to various destination, therefore, enhancing global trade and partnerships as even the perishable goods and reach the required destination on time. Accessibility is a crucial factor so long as there are ports available.

Besides, uncertain demand can well be served by air transport in that in those industries where spare parts and regularly needed due to wear and tear, air transport ensures that they are quickly delivered and available within a short period even if the cost might be higher (Otte et al. 2018). Also, special preparations are required for air cargo to function effectively and efficiently. These preparations include meteorological stations, floodlights, searchlights, and wheelers links.

Air transport has various advantages, and they include rapidity that is the highest speed, comfortable and quick services, no physical barriers, easy access, offers emergency services and does not require investment in the construction of tracks (Hüschelrath et al. 2013). However, it has shortcomings such as small carrying capacity and being uncertain and unreliable.

## 2.9 Global Air Cargo Operations

Air cargo operation is the preparation of cargo shipment, the loading and offloading of the aircraft, and the transfer of cargo between the storage facilities and land transport. For the outbound cargo, it includes amalgamation, building up of cargo pallets and containers, inspection and documentation (Baxter, Srisaeng, and Wild, 2018). While for inbound freight the operations involved are customary and regulatory procedures as well as breaking down single shipments of cargo into several smaller and processing them for final delivery.

There are various reasons for global air cargo operations such as flight representation whereby an individual gets assistance on the ground to ensure the cargo charter functions well. Also, access to more imports in that through being able to connect to various locations even those under-serviced, the cargo can reach to a closer place near to the required destination.

Further, more experienced workers are available who are well trained and can understand all the requirements to manage a charter flight from start to finish and ensure that the cargo is safe and in good conditions with full details (Budd and Ison, 2016).

Global coverage is another essential feature as international networking of offices provide knowledge of both the local region and other places in different places of the continent and world at large. Therefore this ensures cost efficiency as prices are well set for the cargo as the charter offers a solution for the buying power.

Moreover, choice of aircraft is essential in global air cargo operations in that different goods are carried under various conditions thus a particularly preferred plane is required to ensure the safe delivery of the products and no risk of damage during transportation as each will have the containers and handling facilities.

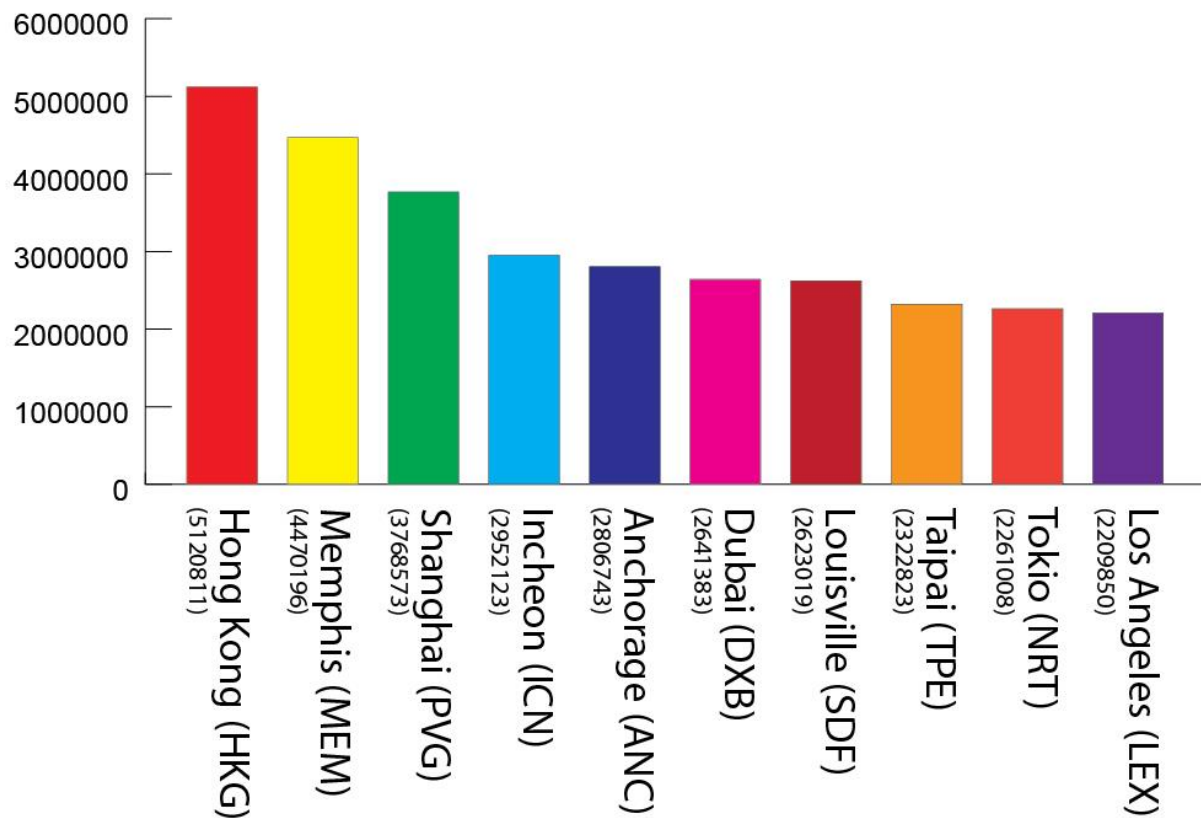
Air cargo traffic is different from air passenger traffic in some ways such as, air passenger travel from one location to the other and may bypass another city before final destination and same way back due to traffic, unlike cargo which is moved to the final destination. In addition, passengers would prefer to reach their destination without stopping somewhere while cargo customers are satisfied as long as shipping time is minimized. The revenue management for cargo is more complicated than that of a passenger due to essential cargo attributes

## 2.10 Comparison of 2017 and 2018

As an overall observation in the top 10 cargo airports around the world handling cargo it can be noticed that the overall cargo figures are on the rise. Total cargo handled in 2018 is more than 2017. Comparing 2017 and 2018 top 10 cargo airports, it is seen that Los Angeles joins top 10 ranking and replaces Paris at number 10. Besides this Tokyo (NRT, Rank 8, 2017) Japan and Taipei (TPE, Rank 9, 2017) change position with each other in 2018. Hong Kong, Memphis and Shanghai remain top 3 airports for both the years. From figure 2 and figure 4

it is observed that top in the count of top 10 passenger airports, five of them are the same as top ten cargo airports in 2017 and 2018 respectively.

**Top 10 cargo airports in 2018 (Total cargo handled in tonnes)**

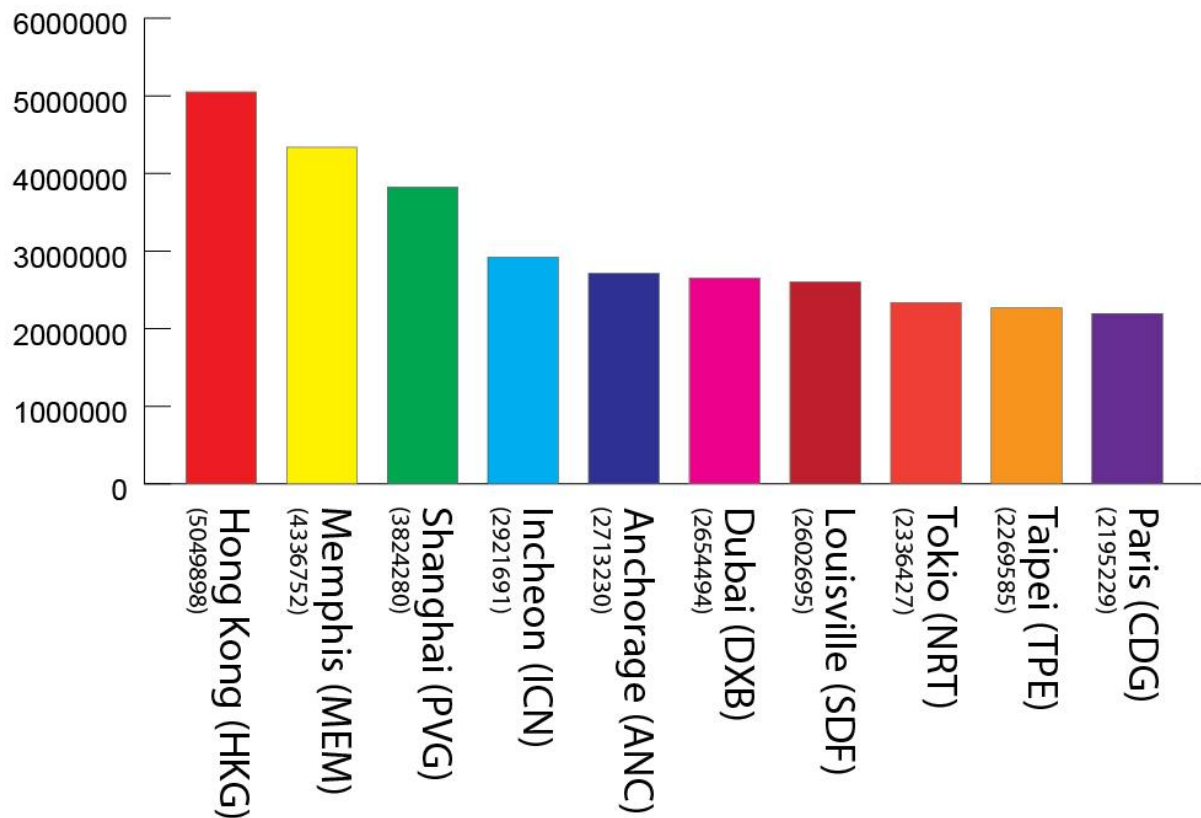


*Figure 2: Top 10 airports based on total cargo*

RANK 2018	AIRPORT CITY / COUNTRY / CODE
1	ATLANTA GA, US (ATL)
2	BEIJING, CN (PEK)
3	DUBAI, AE (DXB)
4	LOS ANGELES CA, US (LAX)
5	TOKYO, JP (HND)
6	CHICAGO IL, US (ORD)
7	LONDON, GB (LHR)
8	HONG KONG, HK (HKG)
9	SHANGHAI, CN (PVG)
10	PARIS, FR (CDG)

*Figure 3: Top 10 passenger airports 2018*

**Top 10 cargo airports in 2017 (Total cargo handled in tonnes)**



**Figure 3: Top 10 airports based on total cargo 2017**

1	ATLANTA
2	BEIJING
3	DUBAI
4	TOKYO
5	LOS ANGELES
6	CHICAGO
7	LONDON
8	HONGKONG
9	SHANGHAI
10	PARIS

**Figure 4: Top 10 passenger airports 2017**

Furthermore, for total international freight 2017, it is observed that Hong Kong is way ahead of the rest of the airports around the globe. (Figure 5). First fair airports remain the same. Singapore, Frankfurt and Doha join the list of total international freight in top 10.

Furthermore, for total international freight 2017, it is observed that Hong Kong is way ahead of the rest of the airports around the globe. (Figure 5). First fair airports remain the same. Singapore, Frankfurt and Doha join the list of total international freight in top 10.

**Top 10 cargo airports in 2018 (Total International Freight in tonnes)**

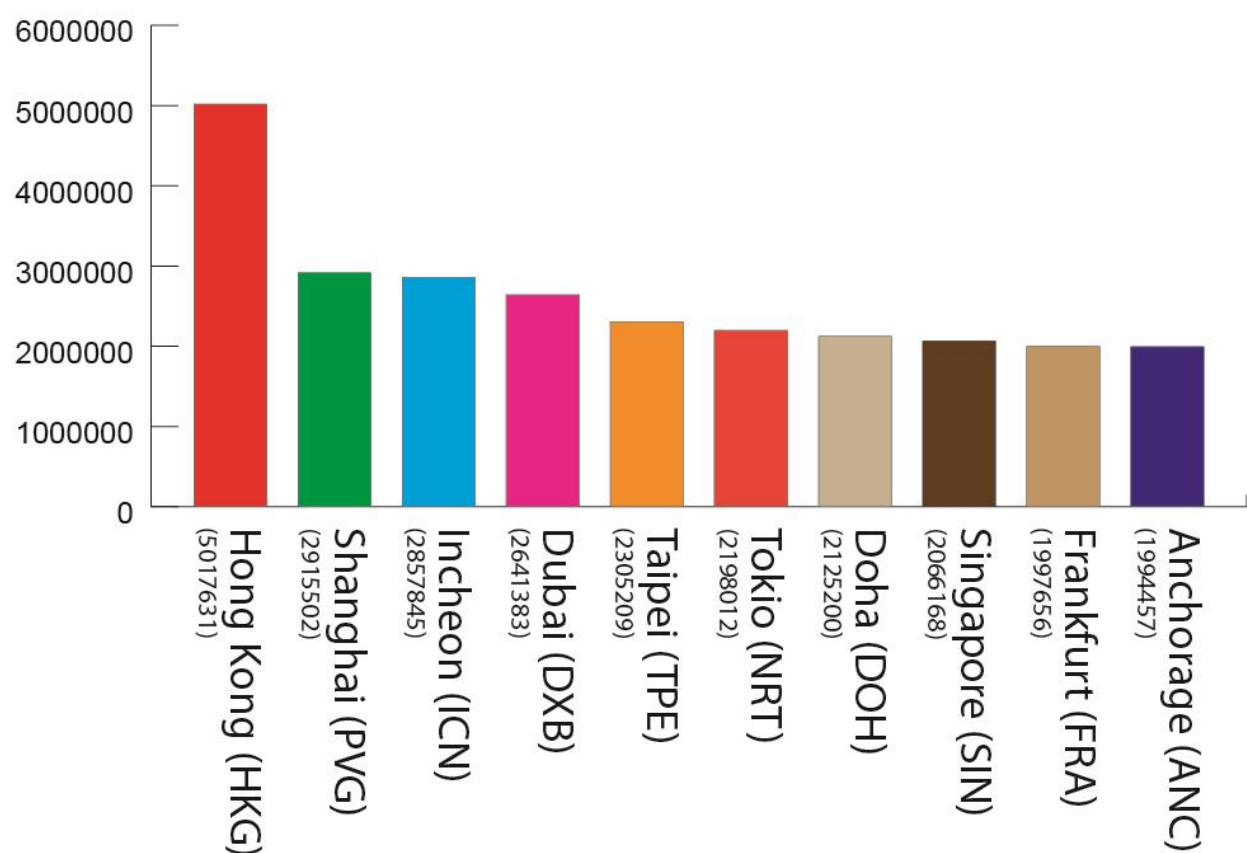


Figure 5: Top 10 Airports based on total International Freight 2018

### Top 10 cargo airports in 2017 (Total International Freight in tonnes)

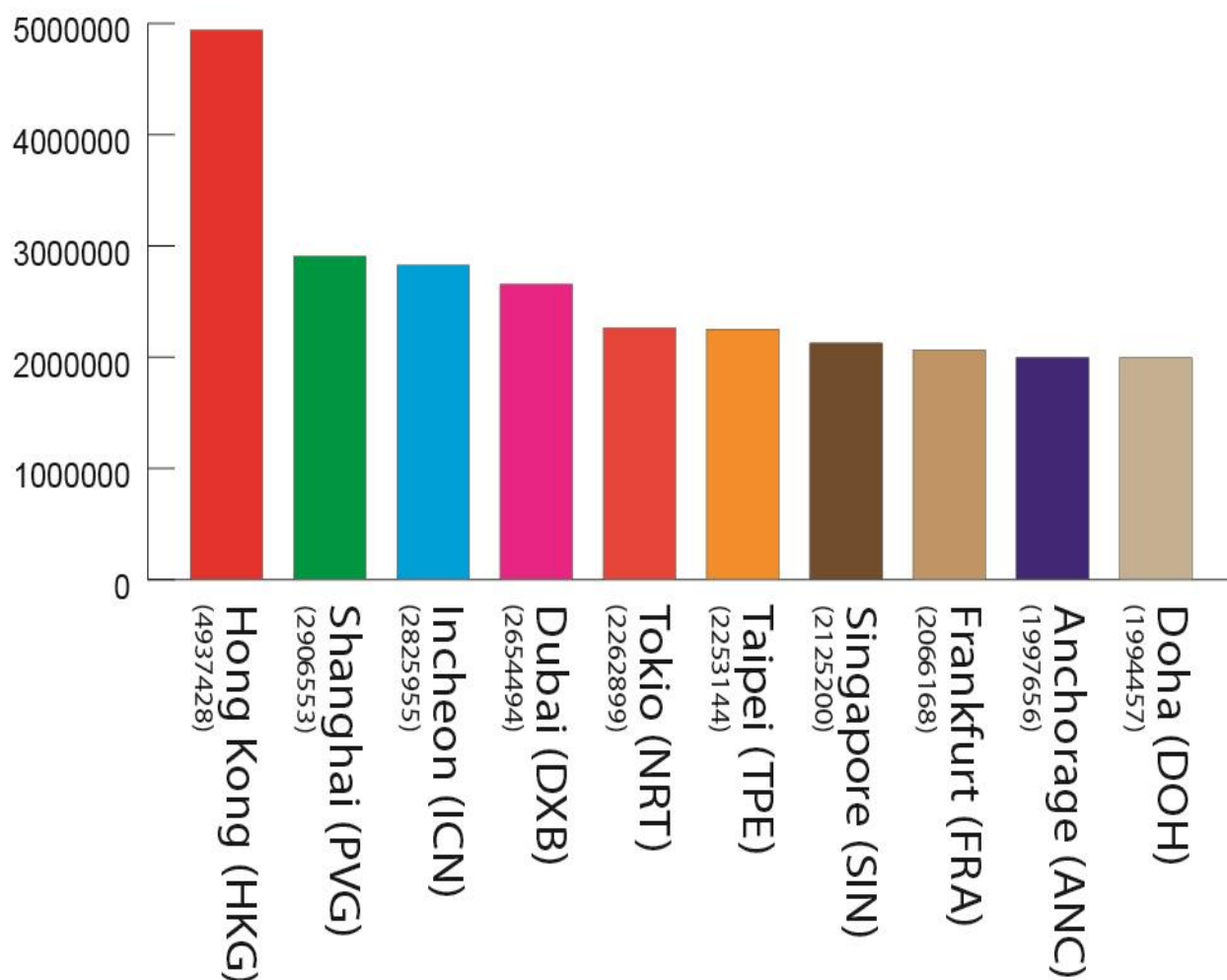


Figure 6: Top 10 Airports based on total International Freight 2017

Talking about the top 20 airports based on geographical location by region for both- total cargo handled and international freight it is shown that Asia Pacific contribute to almost half of the total statistics. Middle East region has the lowest percentage. Asia Pacific is followed by North America in the category of total overall cargo handled however Asia Pacific region is followed by and Europe in the category of total international freight handling

Figure 7

**Top 20 cargo airports by region, 2017 (Total International Freight in tonnes)**

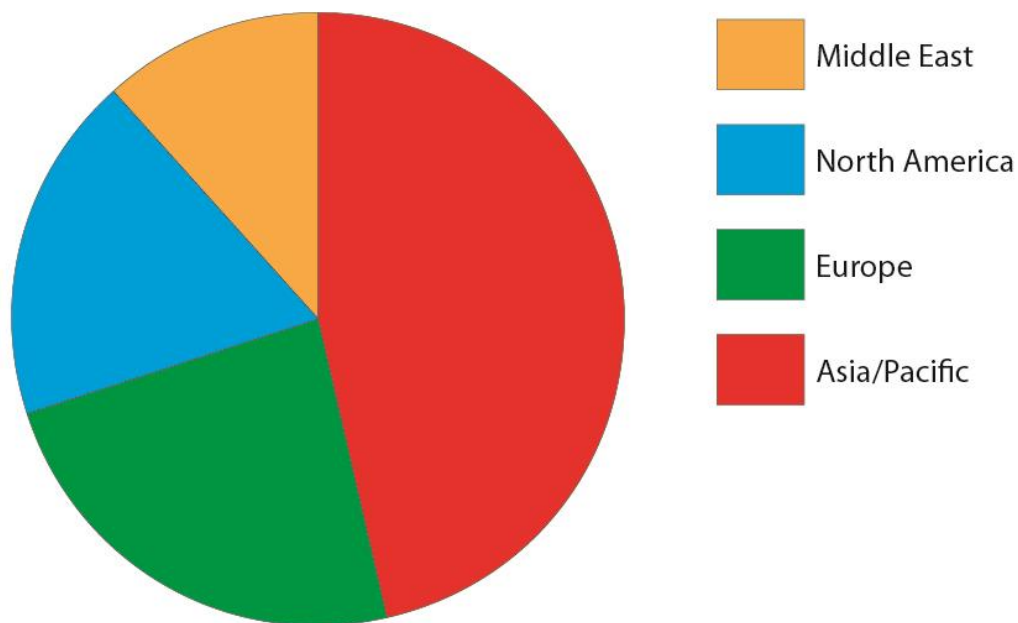
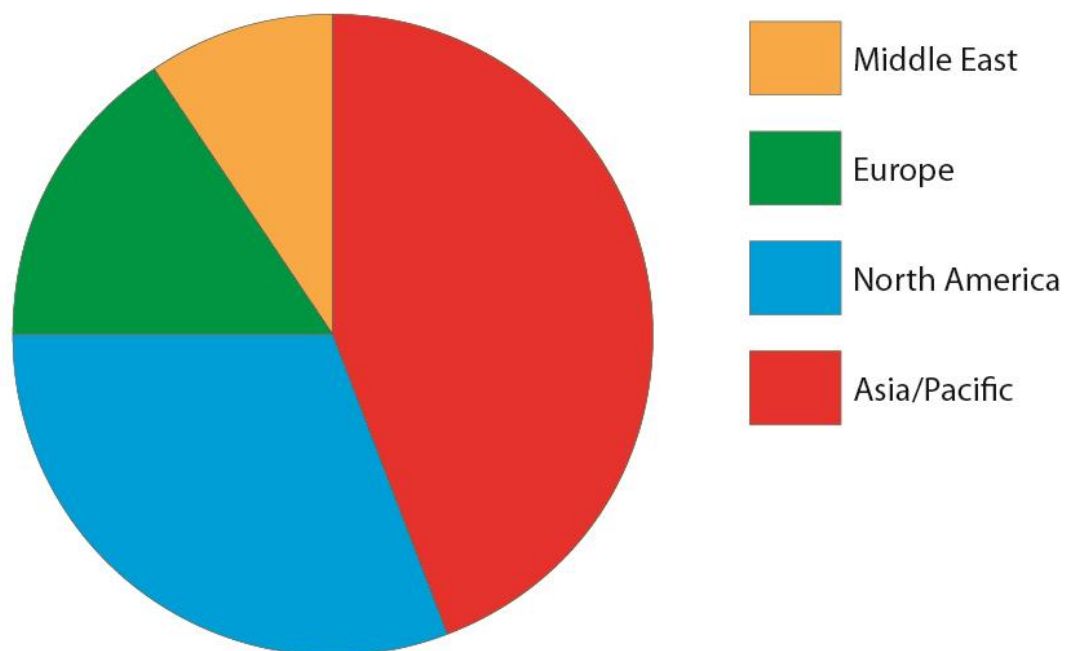


Figure 8

**Top 20 cargo airports by region, 2017 (Total cargo handled in tonnes)**



## 2.11 Specialized Air Cargo

Specialization in a specific type of cargo is essential as the general market has been flooded due to excess supply with demand being very low. Perishable products offer a lucrative deal, for example, pharmaceutical, flowers, fresh products, live food from the sea, and hazardous goods such as batteries made of lithium (Baxter, 2019).

Dealing in shipping a particular product through the air has several advantages as follows: high-level security and reduced risk of damage and theft, which could lead to high losses. The management at the airport is very strict on safety and thus have stringent rules and regulations. Also, speed and reliability, which is essential is offered by cargo as perishable goods can be received by customers without any damage or loss at a convenient time without having to wait for ages.

In addition, the cost of packaging is reduced as they have special containers for transportation of the products with better handling facilities that ensure goods are shipped in good conditions without theft, loss, damage or misplacement. Therefore on specialization, a company will not be forced to acquire various airplane for different products but will have those suitable for the product they are dealing with.

Lastly, specialized air cargo offers tracking, which helps an individual to monitor the time of one's cargo from the departure time to when it arrives. This helps one to prepare adequately for receiving the products (Feng and Shen, 2015). It also ensures that an individual will be able to pay any clearing charges before getting the products. It has various disadvantages such as being very costly, small carrying capacity, more significant risk in case of an accident, requires a large investment to be effective and efficient and specialized skills (Baxter and Srisaeng, 2018).

## 2.12 Air Cargo Business Plan

A business plan in its simplest form can be defined as a business plan is a guide—a roadmap for a business that outlines goals and details how you plan to achieve those goals (articles.bplan.com). The main objective of a business plan is to act as company's selling tool highlighting the company's future strategies. According to Dr John Wensveen, Contents of a business plan generally include:

*“Content of a generic business plan usually include the following:*

- *Executive Summary*
- *Non-Disclosure Statement*
- *Description of the Business and Industry*
- *Market Analysis*
- *Competitor Analysis*
- *Strategic Plan*
- *Organization and Management Plan*
- *Financial Plan and Financial Request*
- *Strategic Action Plans”*

However an air cargo business plan has to be dealt differently and he further argues that the main reason why many air cargo carriers fail is because they use the content of a general business plan. “Thus an air cargo business plan should contain the following

- *Executive Summary*
- *Non-Disclosure Statement*
- *Business Introduction*
- *Mission*
- *Strategy*
- *Market Opportunity*
- *Analysis of Market Demand Levels*
- *Proposed Route Structure and Schedule*
- *Financial Analysis (statements from business plan)*
- *Sales and Promotion Strategy*

- Aircraft Operating Strategy
- Competition and Competitive Response
- Management and Support Team
- Risk Factors
- Invitation to Participate” (as mentioned on the summarized article on [airpedia.com](http://airpedia.com))

According to IATA, speed is the first and foremost proposition of this industry. Shippers tend to choose air cargo so that they can get their products delivered faster. It is further stated that the growth of e-commerce is another factor contributing to the rapid growth and this cannot be ignored. IATA has presented with a SWOT highlights which must be addressed and thought upon while planning or investing in this industry.

Figure 9: IATA’s SWOT Analysis



## **2.13 Airport air cargo facility design and planning process**

This section of literature incorporates a review regarding the best practices, future trends and current innovation in airport cargo facility design and planning process.

### **2.13 (a) Design standards of air cargo facility**

Over the last two decades, trends in business have resulted in a growth in the demand of air cargo. The requirements of an effective management of inventory is manufacturing 'just-in-time' or response quickly to the needs of the consumer. The usage of global outsourcing is also increasing there. Product fulfilment and manufacturing chains of supply needed to be agile enough to change its type, product mix and volume in a short period of time. Consequently, an increasingly important share as well as value of the transport related market is being represented by air cargo. In addition to the emergency cargoes, express, and mail, air transportation uses for fragile commodities, such as flowers, seafood, just in time delivery, and pharmaceuticals. The resulting problems regarding airport air cargo facility design and planning were recognised during the time of literature review:

There is always a need for the planning practitioners of the airport in order to develop methods of better understanding so that they can conduct specific data collection of air cargo and planning studies of air cargo. The activities of air cargo requires dedicated terminals of air cargo, facilities of apron on airports, and warehouses, in addition to the dedicated systems of road. The significance in the data collection of air cargo in the preparation of the forecasts which is required to determine the requirements of the future facility of the airport as well as to ensure the roadways sufficiency for the subsequent truck traffic, both on the airport and the connection to the foremost highways throughout the whole region. The data of air cargo which are required for the forecasting of the air cargo comprises the following:

- Ultimate destination and origin
- Volume or weight of mail or cargo
- Times at destination and origin
- Information of the flight

- Type and value of the commodity
- Characteristics of the truck trip

## 2.14 Air cargo related use of land and requirements access

Numerous studies has been conducted in order to investigate the problems related to the access of landside freight. This study also included for the Institute of Texas Transportation, Texas transportation department, and the Federal Highway Administration (FHWA) which recognises the barriers, needs of infrastructure, issues and the solutions which is concerned with the access of landside freight to the airports. The key problems that were recognised and its possible solutions presented that are included in below table: -

<u>Issues</u>	<u>Solutions</u>
<b>Traffic:</b> The occurrence of problem when the airport access roads are having various intersections, entrances, and their exits and weaves of traffic among the lanes in order to enter and exit the access roads.	During airport design and planning, entrances, exits, and any other intersections must be designed in order to take into account traffic of truck and minimization of the comingling of the automobile and truck traffic. In addition to that, signage along the accession of road should have been provided the clearest access routing to the areas of freight.
<b>Roadway/system design:</b> Roads in the locality of the airports needs to be redesign for larger trucks, including turn radii of requisite at highway and driveway intersections.	Authorities of airport as well as the agencies of local transportation should need in order to consider truck-specific problems when planning for the roadways of airport.
<b>Way finding:</b> The drivers of the truck may or may not be unfamiliar with the routes to an airport. As a result, good signage is very essential in order to provide the accurate directions with enough advance notice for	Solution: Signage should have been in place to direct the traffic of freight to the areas of air cargo so that the trucks do not mix with the other passenger traffic.

allowing the drivers to make changes in lane in advance of intersections and exits.	
<b>Traffic control:</b> High level of unprotected turns to left by the trucks at intersections between driveways of airport-grounds and arterials on the surrounding network of roadway may create serious problems of traffic.	Truck specific traffic problems should must be addressed properly during the stages of planning for the airport.

## 2.15 Operational/Financial considerations

The industry of air cargo had a poor performance financially over the last five years. When the performance of cargo carriers is in a financially poor condition then it might eventually affect the revenues of airport with a decrease in the fees of land as the frequency of tonnages and operations decline. The carriers may also can cease the operations at any of the airport as well as agreements leased by the termination.

### Security

The security problem of the air cargo affect the operations of the airline and the facilities of the airport that are utilised by the carriers of the air cargo. The screening of cargo has become mandatory for all the passenger aircrafts which are loaded with cargo. These instructions requires refitting of the facilities of cargo at the airports in order to accommodate personnel and equipment of screening. This section speeches the outcomes and the policies of screening of air cargo for the transport of air cargo.

### Environmental

Many operators of air cargo are implementing operational and technological changes in order to reduce the effects on energy, quality of the water, quality of the air, and noise. All these changes are summarized in this particular section.

Noise issue – The certification standards of noise for the aircraft have been recognised by the ICAO. All these standards have been combined into national legislation and this are also known in the U.S.

Issues with the air quality – The emissions produced by the aircraft engines that are very similar to any other emissions which results from the combustion of fossil fuel. Unlike all other sources, emissions of the aircraft are very unusual in that an important proportion which is being emitted at higher altitudes.

Issues with energy conservation – With a rise in the cost of fuel, conservation of energy has become very significant to the industry of air cargo as one of the way in which the industry can develop its profitability while reducing its impact on environment. The measures of fuel conservation which have been implemented by the businesses of air cargo in order to reduce the aircraft's cost of energy, hangars of the air cargo, and the ground vehicles.

Issues with the quality of water – The practices of water conservation has been initiated by the UPS in order to minimize the use of water. All these practices includes dry washing of airplanes by using an environment friendly wash agent of enzyme which are reduces the need for rinse water. The companies are also installing fixtures of low flow of water in their facilities

3

## METHODOLOGY

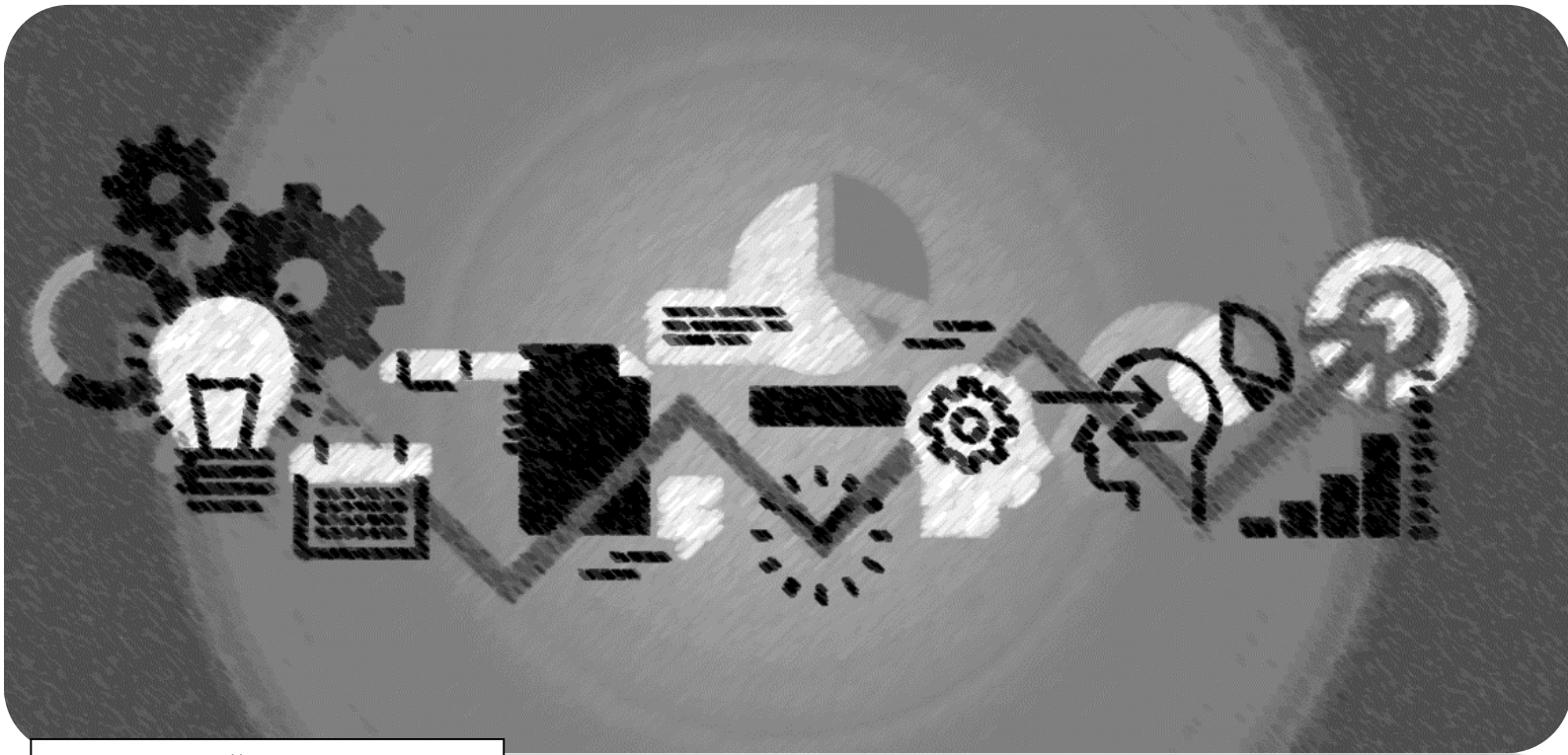


Image source: <https://softwaremarketing.xyz>

This chapter deals with the theories of science and methods used in this report in order to gather the empirical data and analyse it further. The theories of science and methods are opted keeping in mind the research question and the dynamic and uncertain character of the aviation industry.

Taking into consideration the research question and understanding the fact that there are multiple factors (discussed in literature) that influence an airport's growth and economy, positivism philosophy is chosen and the theory of science. This study includes both qualitative and quantitative methods of data collection.

### 3.1 Positivism Philosophy

Nanaimo airport is a relatively new and very small airport. Not a lot of data and past trends are available. Hence this reports includes Positivism Philosophy. The idea of positivism refers to the derivation of data or the factual knowledge form the human observation. In this research analysis tool, it is the observation of the empirical data through the human experience that leads to the development of number of factual analysis (McCusker et al. 2015). This research methodology is based on the deductive approach which is the study of the facts whole incase of the phenomenology, it is the study of the meaning of the different phenomenon of the research. Hence it is to be mentioned that this research philosophy is based on "empiricism" which is based on the complete rejection of intuition and metaphysics (Quinlan et al. 2019). This research philosophy is also based on the empirical view of the world in terms of information and set of data that is important for deriving the required knowledge. Researches of social sciences adhere to this method of research since it is able to produce required data with greater accuracy.

### 3.2 Semi Structured Interviews

The process of structured interviews are the method of conducting standardized interviews by the researches in order to undertake the research under the survey research method, it is part of the quantitative research method that is used for the conducting survey (Quinlan et al. 2019). This involves the formulation of standard set of questions in a semi structure manner in order to conduct the interview in a systematic manner. This technique of interview is likely to incur more response since it has the chances of getting higher responses in verbal interviews. the chosen sample size of the research are asked the similar set of questions in a given order within the given time structured interviews are one the

most efficient ways of deriving the personal insights of the issues in order to find a general pattern in their response.

### 3.3 Deductive Approach

The deductive approach is based on the formulation of a hypotheses from the existing body of ideas. This research approach is derivation of knowledge from the particular to general and the hypotheses is the starting point for such discussion (Quinlan et al. 2019). The deductive approach is defined as the process of deriving the conclusions from the hypotheses by testing them against the existing body of ideas. Another important parameter of the deductive approach is that it has the possibility of understanding the causal relationship between the concepts and viable of the study. The deductive approach is derived from the abundance of sources and it is low risk. However one of the issues of this approach is that there is less time availability in case of the deductive approach of research which is restrictive of the scope of conducting the research.

### 3.4 Co-relational analysis

This method of analysis is based on the statically derived evaluation from the study which is to determine the relationship of the two variables of the study. Depending on the relation of the two variables, number of conclusions is derived depending in the positive or negative measurements (McCusker et al. 2015). The co-relational analysis is based on the dependent and the independent variables. The purpose of this type of analysis is to find the out the changes in the dependent variable due to the change in the independent variable. This is used for the purpose of deriving the strength of the variable and not necessarily it established a relationship between the two variables. A positive correlation reflects in the synchronized increase of the variable while in case of the negative correlation, it is indicative of the inverse relationship between throe two variables.

### 3.5 Content analysis

Content analysis is the process of deriving knowledge based on the analysis of the textual content. This is the process of systematically analyzing the textual material and reaching to evaluation of the documents, graphical and communicative aspects of the same. Content analysis is the process of converting the qualitative data into the quantitative data (McCusker et al. 2015). The method of content analysis is used by their social science scholars, even though it has been one of the most prevalent modes of research for the

organizational scholars. It is based on the rigorous exploration of the content presented and explanation based on the research. Hence it can be defined as the process of reading of the body texts and related matters in order to derive the expected results.

### 3.6 SWOT Analysis

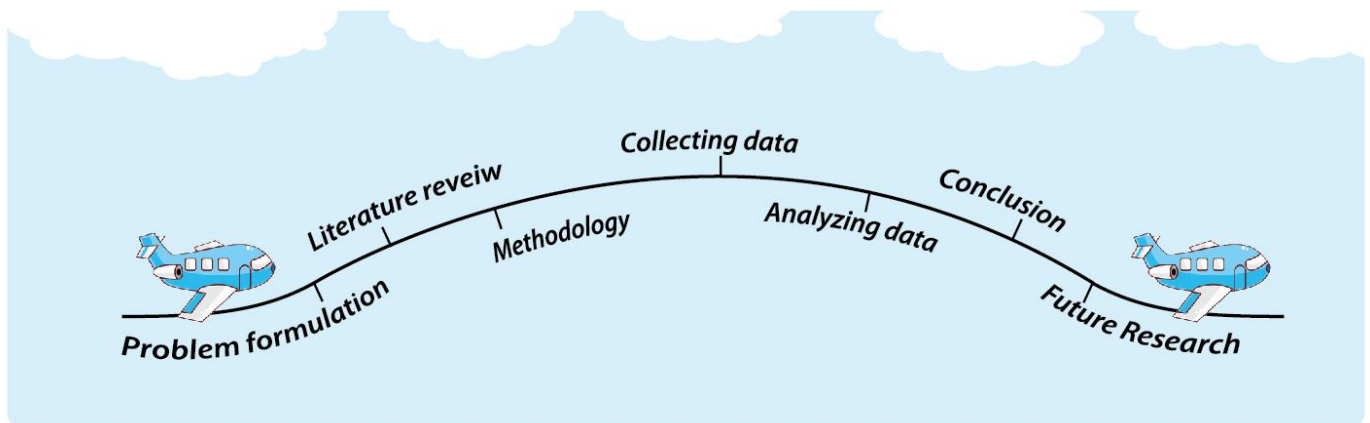
SWOT analysis is the abbreviated form of the strength, weakness, opportunities and threats associated with any entity. It is one of the management tools used for the purpose of deriving the internal analysis of the entity in order to position them within the context of external environment SWOT analysis (McCusker et al. 2015). This is the study of the internal strength and weakness of the chosen entity. This is the strategic planning technique used in most of the cases of project planning. It is part of the planning process of every new company in the market.

### 3.7 Explanatory Design

Explanatory research design is the process of exploring one of the research issues that has not been researched in the past with greater detail (McKenney et al. 2018). This is the study of the topic in greater detail and in order to derive the detailed analysis of the issue. It is mostly conducted in the social science research to understand and analyze the issue in-depth. This research design is generally adopted for the purpose of conducting research where it is crucial to develop further understanding of the issue and there is a fair amount of flexibility of sources. It is also important to note that there are better conclusions derived from the process of explanatory research since it is based on the in-depth understanding of the literature and their existing body of information. Hence it is important to understand that the explanatory research is crucial to gain deeper insight into specific subjects.

### 3.8 Research Design

Figure 10- Research Design



A step by step research design was followed to complete the report in a timely manner. The research on a six step design process (Refer to figure no 7 ) as follows :

- Problem Formulation
- Literature Review
- Methodology
- Collection Emperical Data
- Analysis of Data
- Conclusion and Recommendation

### 3.9 Limitation of the study

In the view point of Simonsohn et al. (2017), there bound to be a number of limitations of a research study, no matter how well it is planned hence this study also contains certain limitations in spite of a proper planning.

Firstly, the time frame was a problem or limitation. During the course of literature review it was realised that there are a number of variables that have to be studied and analysed. Air cargo being a multi chain process is dependent on various actors to draw a concrete analysis. Thus it needs demands more time in order to draw communication with everybody.

In addition to this, availability of resources also remains in question. This study is dependent of the data from secondary resources. However many of the sources containing air cargo figures were at an access at a very high cost. The airline carrying cargo do not want to share any information concerning data thus making it difficult

The biggest limitation was that the study had to be conducted at a distance. Initially it was planned that I will be travelling to Nanaimo, British Columbia, Canada in an agreement with the Nanaimo Airport. The process of data collection was to be conducted in the country. However, due to visa issues (third world country passport) it took almost 2 months in order to process the visa and travel application. Hence the qualitative data and field study could not be conducted thoroughly. The interviews were conducted on skype and in some cases the emails were sent but no response was received. The authorities this not seem interested to respond over telephone or email however they were very positive in the initial stage for a personal face to face interview. The response gained from the respondents might now not be enough for gaining particular outcome. There were problems related to gaining permission of the interview dates from the managers.

## CHAPTER 4



#### 4.1

Cargo means the conveyance of goods by air, water or sea for the purpose of commercial gain (Jiang, Feng and Zhu 2017). Earlier the term cargo was used to refer to conveyance of goods by ships but later the term included freight for carrying the goods by train, truck and others.

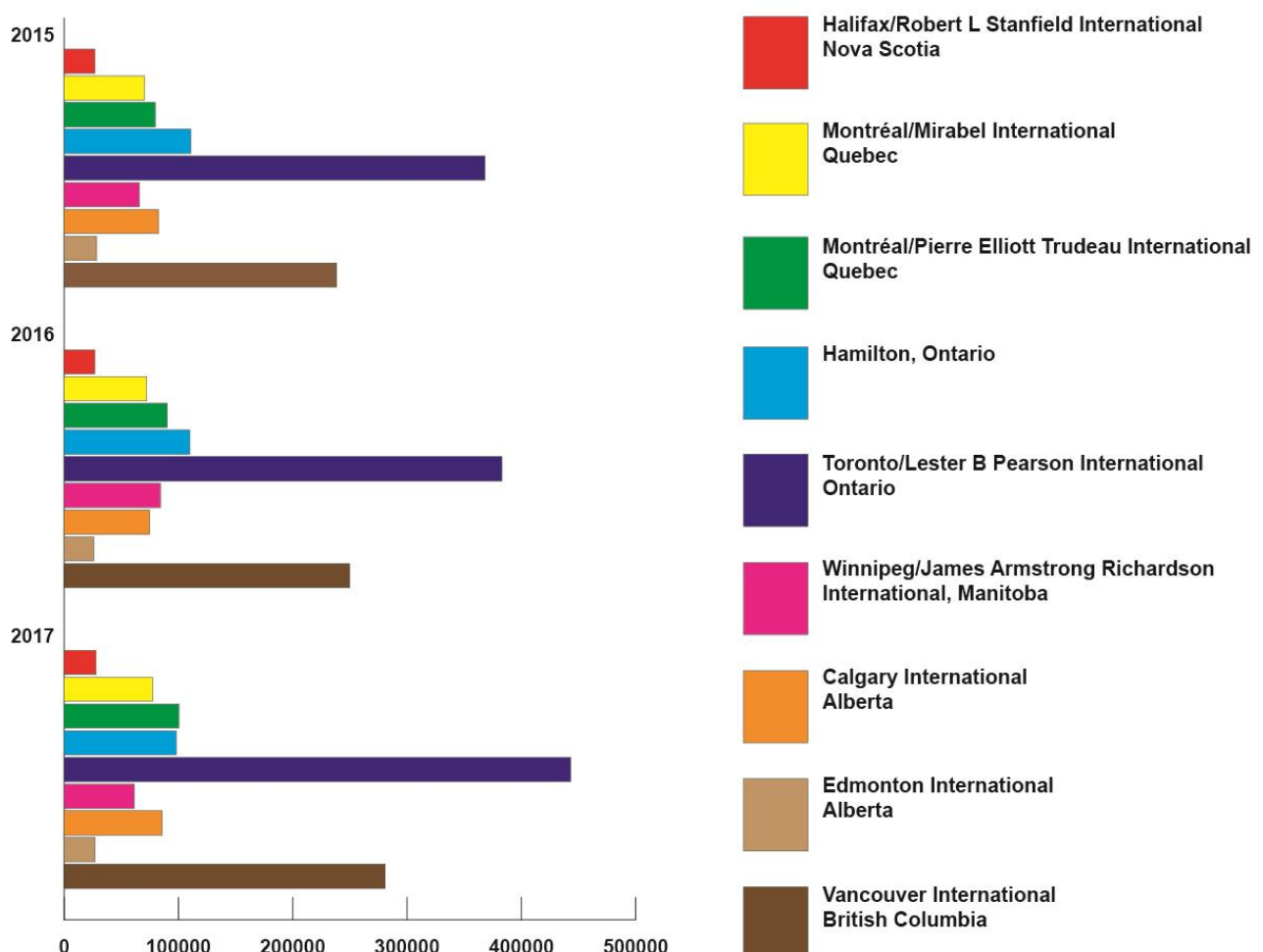
Canada is the country, which is second largest based on the total area it occupies. It is surrounded by oceans on the west, north and east and so it has a national motto of from sea to sea. Transportation and warehouses characterize the Canadian economy by occupying 4.5% of the gross domestic product of the national economy as per the survey conducted in the year 2016 (Hill, LaNore and Véronneau 2015). There has been a continuous improvement in the transportation sector in Canada and it has led to an increase in the compound annual growth in the GDP of Canada over the last few years. Many people are employed in the transportation and the warehousing sector in Canada. About 875 million tons of the goods produced in Canada are transported by the commercial sector. The U.S is still the top partner of Canada in terms of trading. The government of Canada has introduced a new trade model for Canadian trade industry called the Canada's gateway (Statcan.gc.ca. 2019). This strategy of Canadian government is aiming to provide competitive advantage to the country by improving its communication networks with other countries through the gateway. The public expenditure by the government of Canada has increased for the transportation using marine mode. However as stated by one of cargo experts from a leading air cargo company in Canada *"As far in my knowledge the government of Canada has not equally distributed the expenditure across all the modes. The freight by sea as in traditional days occupies most of the attention. Air Cargo is also important and the government of various states needs to understand so."*

#### 4.2 Background and Past Trends

As discussed in the literature section that Aviation is a very dynamic industry. It is thus very hard to predict anything certain. A thorough walkthrough of the past trends has to be analysed to draw sure conclusions. The major Canadian airlines statistics for operation and financial activities have shown an increasing trend in the load factor as the percentage of the operating and financial activities was 81.4% in 2018 and it was 81.6% in January 2019

and 84% in February 2019. The number of passengers carried through the air cargo has also increased in major Canadian airlines from 6615 in October 2018 to 6667 in February 2019. Many Canadian airlines help in transporting small packages of cargos and have been in this business since 1977 and the rates in which air cargo is transferred has been increased and the weights that used to be carried has been increased. However, there has been a decline in the total operating revenues of the airlines from 1884506 in October 2018 to 1781269 in February 2019 (Taylor 2015). The itinerant movements in total has decreased from 50,555 in august 2018 to December 2018 to 28,569. The itinerant movements for domestic air has decreased from 32802 in august 2108 to 22507 in December 2018.

**Air cargo traffic at Canadian airports, annual.**



The above graph shows the annual air cargo traffic at major Canadian Airports for three consecutive years 2015, 2016 and 2017 respectively. The overall air cargo is seen to have

increased. Toronto International Airport in the province of Ontario has the maximum air cargo operations going. Vancouver International Airport in British Columbia. From here it can be stated that these two provinces have the maximum air cargo trade in comparison to the other provinces which are way behind in the numbers. Halifax airport in the state of Nova Scotia has the least cargo.

Canada's transportation system through airways is an important and efficient movement of passengers across the country with different time zones and globally (Schiller and Kenworthy 2017). Cargo services for international and domestic markets is also provide by some of the major international airports of the city. Vancouver international, Toronto Pearson and Hamilton are some of the main cargo airports of the Canada. The northern regions of Canada finds the transportation by airway an important mode because it is not possible to reach these regions by roadways or even railways (Cavada, Cortés and Rey 2017). This is essential for the purpose of medical emergencies, tourism and other factors. The air system of the northern region has created a network for connecting the different parts of the country with the northern region. Air Canada cargo express, air canada rouge and air canada accounts for almost 55% of domestic market. About 64 destinations services are offered to the passengers of the Canadian network. Westjet occupied about 37% of the seat kilometers of the domestic air market along with westjet encore (Taneja 2016). They have about 675 flights in a day. The Canadian airways is aimed at providing a safe and secure transportation for the passengers and the loads. It is aimed at providing about 120000 civil aviation's services in a year. The department of the Canadian aircraft provided licenses to about 3208 unnamed aerial vehicle, 1107 operators of air certificates and many more. In response to the bilateral agreement on air transport preclearance with the U.S, about 13 million passengers got the preclearance at the Canadian airports (Tc.gc.ca. 2019).

### **4.3 Present Strategies of the Government**

Since the government of Canada has decided a strategic plan for improving the transportation of Canada called the transportation 2030 and it will be focusing on 5 main areas. This approach will focus on transporting both passengers and cargos. These are the traveller, innovative and green transportation, trade corridors to improve the global

communication, water ways and safer transportation (Radushinsky et al. 2017). This shows there is better opportunities for the Canadian cargo delivery. The Canadian government is aiming to improve the Canadian transportation and experience through the airways by implementing the transportation modernization act. The main aim of the act is to improve the air services by creating and following a set of rules relating to the treatment of passengers, changes in the rules relating to the ownership of the airlines to reduce the airline fares and to promote air cargo business of Canadian companies. The areas that this plan will focus on is the security and safety, value proposition, business transformation and digitalization. The priorities of this strategy is increasing safety, improving trade, following the global standards of efficiency, air cargo modernization, giving strengths to air cargos value proposition, enhancing the quality and some others.

#### 4.4 Market Opportunities

Dresner and Zou in the business case of air cargo (discussed in literature review) explain the time value of money. There are numerous market opportunities for the aviation industry especially for the cargos because of different varieties of commodities that are required to be transferred through air cargo and here the speedy delivery aspect of air cargo has to be considered. Perishable commodities are often transferred through air cargo and in fact they need special attention while delivery through proper storage facilities. In British Columbia, Air cargo has good opportunities for the delivering perishable goods such as the fresh farm produce and others. Greenhouse farms, nursery farms and the eggs and poultry characterize British Columbia and form a major part of perishable air cargo. The blueberry farming area has been expanded (Dorward, Smukler and Mullinix 2017). The cropland of British Columbia cropland is divided into- fruits 4.1%, vegetables occupy about 1.1%, field crops occupy 29.8%. The spring wheat area in Canada has increased since 2006, British Columbia is famous for having the largest areas of apricots and raspberries this has increased the scope for perishable air cargo. Besides these, British Columbia is known for its products of wood manufacturing, manufacture of paper, oil extraction are some of the goods that occupy the exports of the country (Shortt and O'Brien 2016).

The enplaning and deplaning of the passengers of the Canadian airports was about 149.6% in the year 2017 which has gone up by 6.2% from the previous years. The major airports of the British Columbia that affects the air cargo is Vancouver international, Pierre Elliot

Montreal and Pearson in Toronto (Bachmann 2017). In the year 2017, the airline sector experienced growth due to increase in the number of passengers leading to domestic sector expansion. International traffic had also seen an expansion in the year 2017 and also the border across the traffic majorly between the Canada and U.S leading to the growth of the overall sector. The growth in the traffic across the borders was again seen in the year 2017. Pearson Toronto, Vancouver international and Pierre Elliot Montreal majorly gained the enplaning and the deplaning of the passengers and handling of the passenger traffic. The weights of loading and unloading the cargo at Canada has increased by 7.4% in the year 2017 as compared to the previous years (Huber 2016).

An increase was also seen in the domestic cargo as it reached 577000 in the year 2017. The weights of the cargo for transferring across the borders has also increased. The total weights of loaded and unloaded cargo increased from the year 2016 to 2017 from 1223213 to 1313376 and increased by 7.4% from 2016 to 2017. However, the data represented for the cargo loaded and unloaded is not so accurate because many local and regional carriers do not give their data for the purpose of the survey (Costa and Almeida 2015). Another reason for inaccurate data is that domestic cargo data's are not included in the major survey of charter. These carriers – schedules services and charter services, provide many services (Bazargan 2016). Schedule services are those services in which the airlines decides the schedule of arrival and departure and the charter services are availed when a client wants the departure or arrival of the flight different from the regular routine. Some services offered by the Canadian air cargo are- Aer lingus, air Algeie and others and some of the character services are Air foyle, air st pierre and others (Button 2017).

#### 4.5 Analysis of the existing strategies

The top five airline cargo in British Columbia are- Air Canada, air Canada jazz, WestJet, air Transat and air north (Law et al., 2017). These airlines are engaged in transporting of passengers as well as cargo loads in the domestic area and across borders. The Vancouver international airport supports two major cargo carriers- Air Canada and Air Transat. Air Canada cargo offers services to around 150 destinations around the globe along with shipping facilities. Goods can easily be transferred to any other continents with the help of air Canada (Baumgraß et al., 2015). There are various route-planning tools provided the air is shipping Canada, through which the passengers can see the destination of the

cargos. It also helps to see the flight schedules and the time required to transfer the cargo. The business model followed by air Canada is that of hub and spoke model (An, Zhang and Zeng, 2015). This model is a traditional one and has been followed for ages and it is not only applicable for the transportation but also in other different fields. In this model, there is a central hub that is the airport and the planes are routed from there. The spokes are the routes that are being followed by the planes. The Air Canada has Vancouver International Airport as its hub and central airport from where all the routes are then decided. The different routes of the plane are called the spokes. The main advantage of this model is that the airlines can ensure its clients about the routes and the time taken to transfer the cargo (Gross and Lück, 2016). Air Canada also provides for various route planning tools to further support its business model of hub and spoke. The business model used by air Transat is the LCC business model or the low cost carrier business model. Under the low cost carrier business model, businesses try to sustain in the market and maintain its position using the low cost technique. In the low cost business model, the airlines try to reduce their operational costs by reducing the fares of the airlines. To do this the airlines reduce the comfort services otherwise provided to the clients to reduce the fare of the airlines. In order to make up the loss suffered from charging lower prices for the tickets, the company charges certain amount of additional fees from the customers such as extra charges for baggage. This technique of low cost carriers is used by the airlines to get a competitive advantage over the customers (Fageda, Suau-Sanchez and Mason 2015). This is how air transact maintains its profitability and market share using low cost techniques. The Nanaimo airport is the new airport that is being used by air Canada and this is affecting the business model followed by air Canada because the air Canada is changing its hub from the Vancouver international airport to the Nanaimo airport and therefore the routes of the Air Canada are changing (Calder et al., 2018). This new airport is also affecting the air transact because it is providing flights at a cheaper cost so it is giving competition to the airlines which were using the low cost carrier model. This new airport has been able to attract the passenger traffic from other airports due to the additional facilities that it offers (Tetra Tech 2016).

#### **4.6 Nanaimo Airport's Geographical Location**

Based on discussion in the literature section regarding the choice of airport by cargo companies, it is discussed that the geographical location of the airport is an important factor that influences the option of the airport. Nanaimo airport lies in the British Columbia, south east region. Raymond Collishaw was the inspiration behind the name of the air terminal (Mahmoud 2017). This is the air terminal for the passengers. This airport is embedded with the advanced system for landing instrument it also provides the features of the climate predictability for the airplanes (Spinelli et al., 2016). It provides wider range of amenities and services to the customers such as –hotel facility, cab facilities, gift shops and many others. Nanaimo airport provides parking facilities for long term and short term to the clients to meet their requirements. The airport also provides special parking facilities for disabled clients (Quarter, Mook and Armstrong 2017).

#### **Nanaimo Port**

The cargo volume in the port of the Nanaimo cargo has increased from 2146807 in 2015 to 2475330 in 2018. The types of cargo provided by Nanaimo port is logs, forest products, bulk cargos, project cargos, chemicals, petroleum products and containers (Thubagere et al., 2017). In fact the rates of the cargos have increased such as the forest products cargos have increased from 1486396, 2016 to 2096062 in the year 2018. Similarly there has been increase in other types of cargos also. In the Nanaimo harbour the sea ships traffic for deep sea have shown an increasing trend from 240 in 2016, to 277 in 2017 to 286 in the year 2018. The delivery of the container cargos have also shown an increasing trend in both imports and exports. TEU'S of imports have changed and increased from 21740 in 2016, to 22637 in 2017 to 22642 in 2018. The exports of the containers have increased from 21284 in the year 2016 to 21523 in 2017 to 22249 in the year 2018. These reports shows that customers are now trusting the Nanaimo airport for the purpose of delivery of their different types of cargo and if these continue in the future then the company can gain a competitive advantage over other ports in Canada. Thus this might act as a weakness in the development of the cargo sector at the airport.

#### **Cargo Terminal**

Cargo terminal is the place in the airport where processing of freight or cargo takes place. It is important for airports to have such processing points (Almetova, Shepelev and Shepelev, 2016.). It will help to improve the efficiency of cargo loading and unloading. As stated in the theoretical framework, Block chain is the recent initiative in the aviation industry as it helps to keep track of all the information's related to the transactions and brings security to the system (Taneja 2016). This technique will help in establishing processing nodes in proper location and thereby help in reducing the complexity of the business. This technique will also help to bring compliance for the cargo carriers because of the readiness of the market to the technology. Presently Nanaimo airport has very small air cargo and to operate economically and effectively it is important for the airport to adopt a cargo model. This will help the airport makes it easy for its airlines to makes a separate aircraft for cargo because if the cargo is carried with the passenger aircraft the space for cargo will be reduced (Feng, Li and Shen, 2015). Having a technically advanced air cargo terminal can be the airport's strength and it can therefore be mentioned that it is beneficial to invest in air cargo apart from the passenger's space. Security and speed (Drenser and Zou) being the two most important aspects, It will help to reduce the risk that otherwise is caused to improper handling through other modes of transport and it also means easier and faster delivery of goods. Through the existence of air cargo at the the airport can transport the goods to any part of the globe thus marking the airport's entry into the international trade by air freight and the warehousing activities can be reduced because the cargo need not be kept in stock and can be delivered immediately. The Nanaimo airport can invest in a block chain terminal because it will help to provide compliance in the carrier system and provide security (Lin et al. 2015).

#### **4.8 Analysis of Business model of Nanaimo airport**

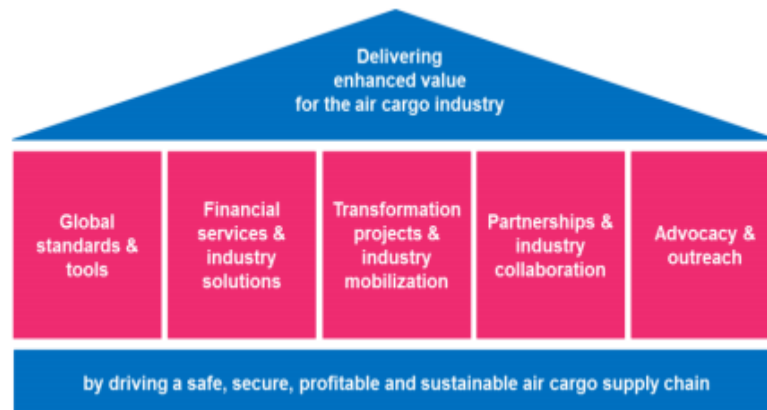
The business model used in the aviation industry can be of various types such as legacy industry, the low cost carriers, regional carriers, cargo carriers and others. The business model used by the Nanaimo airport is that of low cost carriers because the aim of the airport is to provide carriers both passengers and cargo at the minimum fare. The model is based on the principle that customers can be attracted through low fares (Oliveira, 2017). Nanaimo Airport as present is focusing on providing the lowest cost of fares for short route trips for both air cargo and passengers. However, in order to achieve competitive advantage,

the airport needs to make use of digital strategies for the purpose of delivering the goods. The digital strategies will help the airport to improve their efficiency of operations while optimizing the cost of the operations. Technology disruption is being used in all the field so there is scope for the same in the aviation industry. This way the including airlines can become successful by using digital strategy in their business models. In order to meet the customer's requirement, it is important for the aviation industry to create and adapt digital process and business models (Dresner and Zou, 2016). This technique will not only reduce the cost but it will also help in improving the efficiency and also satisfy the customers. The airport can also use a hybrid model combining various other business models. The port can combine the cargo business model with that of the low cost carrier's model.

#### 4.9 Competition and Competitive Responses

Nanaimo airport faces fierce competition from the Vancouver airport that carries out air cargo operations and is the second largest airport in the country in that context. The Vancouver airport is one of the oldest airports of Canada and people have known it for years. This creates problem for the Nanaimo airport because it is relatively new and still many passengers use Vancouver airport in order to deliver their cargos. However, in response of this competition that the Vancouver port, the Nanaimo airport has decided to provide many value added services in order to attract the passengers and increase the flow of domestic flights. As stated by one of the officials of the airport- *"The Nanaimo airport is trying to establish a working partnership with DP World for its air cargo facilities and we are thinking of express deliveries"*. DP World provides facilities of diversified commodities loading and also provides facilities of shipment to and from .It aims at providing broader distribution by shipping facilities directly to the international ports and airports with its integrated feeder services. The short ships are more cost effective, efficient and delivers the goods faster. Here the plan is to established in a way that a connection is established between the major terminals of Nanaimo port - The Duke point and Nanaimo assembly wharf for the purpose of movement of commodities including the transport of cargos of lumber, petroleum, steel, logs, there are other project cargos, it could be beneficial for the airport

#### 4.10 Strategic Plan For Nanaimo airport



IATA Cargo strategy

As discussed in literature review, IATA strategy aims at delivering value to the cargo industry by using global tools to meet the standards. The strategy aims at providing various financial services for solving various problems of the industry, carrying out transformation project and entering into various partnerships and providing advocacy facilities. All this can be achieved through a proper air cargo supply chain management. Based on John Wensveen's analysis of the elements an Air Cargo Business Plan should contain, a strategy is proposed which is elaborated in the following section.

The business plan of Nanaimo airport will include the following elements-

##### Executive summary

In order to become successful with the cargo, the airport will needs to look after certain factors such as speed, security, accuracy etc to meet the needs of the customers and for proper delivery of the cargo. The market opportunities in relation to perishable crops (discussed earlier) that would require speedy delivery and express package delivery needs to be considered. At the same time available past trends and demand analysis has to be done. Due to non-availability of data this aspect could not be covered in this report.

### Non-disclosure statement

The non-disclosure statement between the airport and the various cargo partners will be prepared. This will ensure that all the confidential information relating to the business plan is not revealed to people other than the stakeholders.

### Mission

The mission of this plan in particular should be to see if the air cargo can really work efficiently. What actors can be involved in the process and if the present passenger carrier like Air Canada and Air Transat be will be interested in opting for Nanaimo as an airport.

### Strategy

The ways to achieve the mission is through ensuring a hybrid cargo passenger model that ensures the transport of both the cargos and passengers. Inviting Combination carriers and allowing airlines to use Nanaimo as a transit Airport can boost the business.

### Market opportunity

Already discussed in the previous sections how Air Cargo is experiencing growth both in Canada and North American Region, thus stating that there is definitely a need in the market. The region of Nanaimo is rich in natural resources and vegetation. Thus the domestic air cargo over far spread areas of the country where the climatic conditions are harsh can be an opportunity. The airport can take advantage of these opportunities to improve its trade.

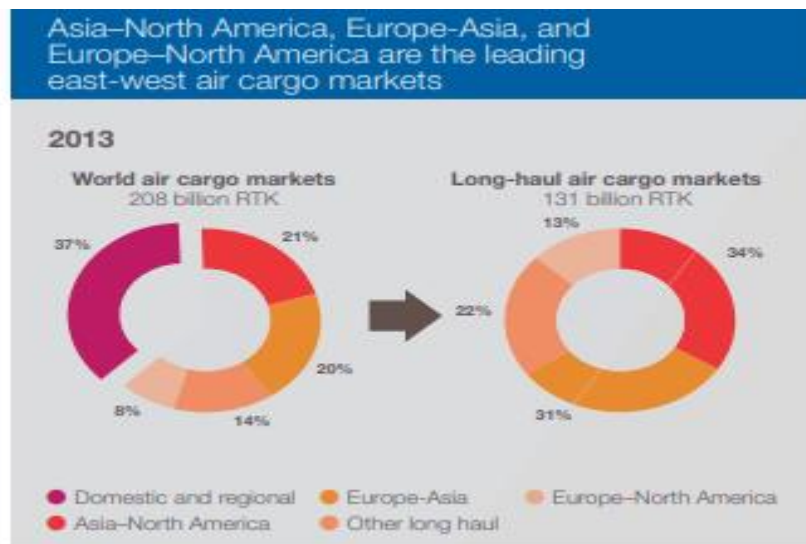


Figure 2: Market opportunity

Source: (

#### Market demand level analysis

Demand for the air cargo on an overall level is increasing in the country because of the change in the traffic for air cargos as is shown in the graph below:

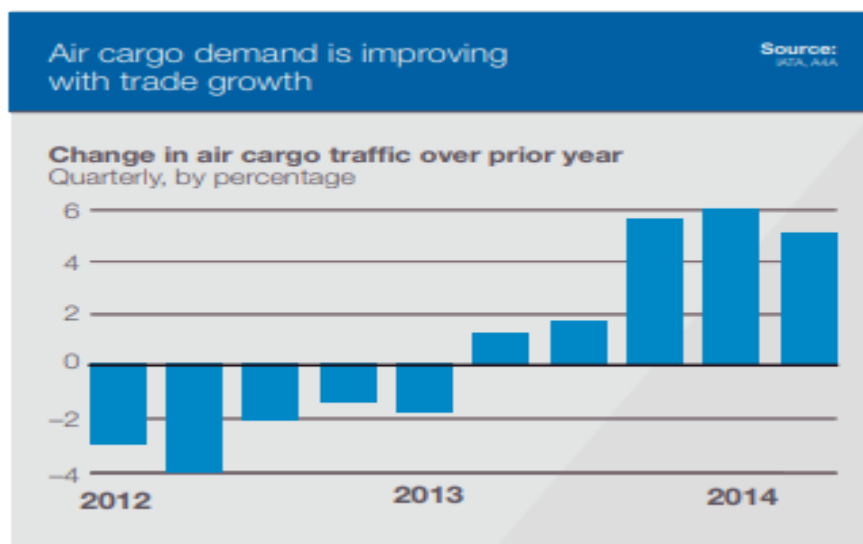


Figure 2: market demand for air cargos

Source:

### Proposed route structure and schedule

The route scheduling means reducing the transportation cost by mathematically calculating the assignment of time for each stoppage and other activities. This helps in reducing the overall operations cost. This is thus very important to choose for the routes in such a way that it brings in revenue from both passengers and cargo

### Promotion strategy

The strategy that can be used by the Nanaimo airport to attract new customers besides the existing customers is through providing offers of discounts in its services and other techniques.

### Aircraft operating strategy

The aircraft operating strategy is to reduce the operating cost by properly allocating the space of the aircraft equally between the passengers and the cargo. Hybrid business model needs to be used by the airport.

### Competition and competitive response

Nanaimo airport can face competition related to the low cost carriers models that it uses because there are other competitors who use the same technique. The biggest threat here is the Vancouver international Airport. A plan on how this can be worked out is required.

### Management and support team

A proper management and support team will ensure the security of the cargo goods being delivered and will also help to improve the customers experience travelling by the Nanaimo airport. There can be proper teams to look after the needs of the customers regarding their queries and others. The operations management team should comprise of experienced people who have worked for land and cargo management

### Risk factors

The major risk factors of this business plan are the competitive risk and the financial risks. The company aims at reducing the cost of its fares for its customers and for its delivering the cargos between proper routes. The financial risk can be reduced by using proper security mechanism for the air cargos and passengers travelling because due to sudden bombing and

other issues there is huge amount of monetary loss in terms of the goods being wasted and others. The competitive risk comes from other airports which have gained a good market position because of their long history and existence.

#### Political problems

The country itself has a very troubling and confused political situation, which impacts up on the air freight business as well. The policies and political agendas taken by the government or the political bodies have certain negative impacts on the business of the country, since the public and private bodies are equally involved in the system. In an interview one of the official from Nanaimo airport states that *“Among others the political situation in the area is always an issues. It takes long before a decision could be made. Since everything in this industry changes so fast, sometimes it is too late to implement the decisions thus made”*. “Thus Nanaimo airport may also face problems in its air cargo services due to political barriers. And hence a plan on how to face and overcome such problems has to be carefully examined.

#### Climatic problems

The climatic conditions of the country often create much hindrances in the conduct of business. Canada is often perceived with upsetting weather conditions due to the climate changes. The global warming has impacted up on the country in various ways. Extreme temperatures, smog and fog, storms and heavy rains, pose serious barriers in the conduct of business on the country. These create problems for faster delivery of cargo by air. This can act both an advantage and a disadvantage to the airport. The climate in the airport is considered better in comparison to many other similar sized airports located in the country. However this factor is already adding to the benefits of the location of Vancouver International airport.

#### Overexpansion

One of the major reasons for the failure of air cargos is due to overexpansion or enlargement (Wensveen, J., 2018). The number of flights in the airport has increased and so has the number of passengers. One of the manager at the airport mention *“Overexpansion causes wastage of resources due to unnecessary creation of planes by the government of*

*Canada. Air traffic is the result of over expansion of the air planes. So many plane are flying together at the same time for delivering cargos, or passengers that there is too much of air traffic leading to further delays in delivery of the commodities.”* Since Nanaimo airport is expanding it should definitely be analysed that how much of the expansion is needed that the airport can thereafter benefit from it.

#### Undercapitalization

The main reason for the failure of air cargos is due to undercapitalization.

Undercapitalization means that for proper functioning of the business the business is not being able to acquire sufficient funds and as a result it is not being able to operate effectively and efficiently. The aviation industry is one of the most undercapitalized industries of all times (Dresner and Zou). Due to undercapitalization the aviation industry is lagging behind of other industries. Undercapitalization leads to further problems. It would be beneficial to put separate funds for the cargo sector in the airport.

#### Lack of leadership

The aviation industry is still being controlled by the government and so is the Airport of Nanaimo therefore it levies various taxes on the airport. *“The airport has to pay a lot of earned income into the state tax system adds another official”* It is also influenced by all other stakeholders. Therefore there is need for proper leadership for it to become successful and to take it in a right direction.

#### Aviation security risks

There are security threats such as hijacking of cargo planes that carries cargo. There are cases of bombing all cargo planes that were carrying explosive cargoes (Gillen and Morrison, 2015). There are risks due to poor weather conditions. There have been many instances of bombing in spite of proper care being taken by the security agencies. Therefore there needs to be proper security facilities for the cargo planes.

#### Risk from Technology limitations

Technology is used in cargo screening for identifying cargos carrying with explosives or dangerous material or hazardous material. Explosive trace detection is the technique for identifying and giving alarms in case explosives are identified. There are experienced people for using the device. If the airport fails to employ specialized and trained people then they

may not be able to use the device properly and as a result there may be some cargos with unidentified explosives which will further lead to greater losses in terms of financial resources and resources in terms of material wastage due to bombing. In order to make use of the technology efficiently, there need to be right people for handling and dealing with the same.

#### Inventory policy

Due to risks in the supply chain and disruptions continuously growing, it has become important for the aviation industry to maintain lean inventory policies. There are safety stocks kept by the retailers and manufacturers for meeting the demand of the customers and in case of any emergency in the air freights. It was seen that companies which keep smaller amounts of inventory face more difficulties related to supply chain and also have to face the problem of higher air freights. Since the cost of transportation is high so the companies try to deliver as much goods as possible. This may result in overweight of cargos.

## 5.1 Conclusion

The aim of the current project was to research if for a new and a very small airport (Nanaimo Airport) cargo is a feasible strategy. Even though the process of the data collection did not go as assumed because of the limitations (discussed in chapter 3) the study was able to determine the most important aspects to be considered while planning cargo within an airport.

- There is an overall rise in the increase in air cargo. The maximum Air Cargo operations are carried in the Asia Pacific region
- The Business Plan of an Air Cargo should not have the content of a generic Business Plan as it includes different aspects that have to study.
- Speedy Delivery and Security are the key elements of the Air Cargo Business Plan.
- Cargo can be beneficial to a growing airports if the factors such as Airport location, market opportunities, Currents tech trends and most importantly integrated services are offered to the shipper
- IATA's Cargo Strategy which focuses on the speed as the prime factor along with Strengths, Weaknesses, opportunities and Threats should be analyzed.

The Findings suggest that are many additional factors such as Political situation and harsh climatic conditions etc can be challenging while making decisions in cargo of an airport.

According to Dresner and Zou Air Cargo should have a flexible approach because of its dynamic nature has to be innovative in its business approach thereby taking the advantage of the new opportunities in the market depending upon the demand of the consumers.

## 5.2 Future Research

The future research in the context of this study can focus on which approach can actually be beneficial for the airport? Various permutations can be thought upon in this case. Combination carriers, Integrators and forwarders or All Cargo Carriers Non Integrators and Forwarders, Both Combination Carriers and All cargo carriers, Integrators and forwarders.

Current tech trends such as Block chain and Machine Learning technology can be studied that how can the cargo in small airports can benefit from it. At the same time the air cargo is highly effected by e-commerce however in the future with technologies like 3 D printing are set to have effect the market highly. How this can actually effect the air cargo business and if the big and small airports and airline carriers ready for it?

## References

- ‘AeroLogic’. *Infrastructures*, 3(1), p.7. Baxter, G., 2019. Capturing and Delivering Value in the Trans-Atlantic Air Travel Market: The Case of the Air France-KLM, Delta Air Lines, and Virgin Atlantic Airways Strategic Joint Venture. *MAD-Magazine of Aviation Development*, 7(1), pp.17-37.
- A, Z., Shepelev, V. and Shepelev, S., 2016. Cargo transit terminal locations according to the existing transport network configuration. *Procedia Engineering*, 150, pp.1396-1402.
- An, Y., Zhang, Y. and Zeng, B., 2015. The reliable hub-and-spoke design problem: Models and algorithms. *Transportation Research Part B: Methodological*, 77, pp.103-122.
- Barz, C. and Gartner, D., 2016. Air cargo network revenue management. *Transportation Science*, 50(4), pp.1206-1222.
- Baxter, G. and Srisaeng, P., 2018. Cooperating to compete in the global air cargo industry: The case of the DHL express and lufthansa cargo ag joint venture airline
- Bachmann, C., 2017. Modeling the impacts of free trade agreements on domestic transportation gateways, corridors, and ports. *Transportation Research Record*, 2611(1), pp.1-10.
- Baumgraß, A., Dijkman, R., Grefen, P., Pourmirza, S., Völzer, H. and Weske, M., 2015, October. A software architecture for transportation planning and monitoring in a collaborative network. In *Working Conference on Virtual Enterprises* (pp. 277-284). Springer, Cham.
- Bazargan, M., 2016. *Airline operations and scheduling*. Routledge.
- Burghouwt, G., 2016. *Airline network development in Europe and its implications for airport planning*. Routledge.
- Button, K., 2017. *Airline deregulation: international experiences*. Routledge.
- Calder, K.D., Eng, M., Eng, P. and Senez, P., Vancouver Airport Fuel Delivery Project.

- Carey, S. and Crichton, J., 2015. NAV Canada draws interest in US. *Wall Street Journal*.
- Cavada, J.P., Cortés, C.E. and Rey, P.A., 2017. A simulation approach to modelling baggage handling systems at an international airport. *Simulation Modelling Practice and Theory*, 75, pp.146-164.
- Costa, V. and Almeida, C., 2015. Low-cost carriers, local economy and tourism development at four Portuguese airports. a model of cost–benefit analysis. *Journal of Spatial and Organizational Dynamics*, 3(4), pp.245-261.
- Dorward, C., Smukler, S.M. and Mullinix, K., 2017. A novel methodology to assess land-based food self-reliance in the Southwest British Columbia bioregion. *Renewable Agriculture and Food Systems*, 32(2), pp.112-130.
- Dresner, M. and Zou, L., 2016. Air cargo and logistics. *Air Transport Management: An International Perspective*, pp.247-264.
- *Engineering and Operations Management (IEOM)* (pp. 1-10). IEEE.
- Etikan, I., Musa, S.A. and Alkassim, R.S., 2016. Comparison of convenience sampling and purposive sampling. *American journal of theoretical and applied statistics*, 5(1), pp.1-4.
- Fageda, X., Suau-Sanchez, P. and Mason, K.J., 2015. The evolving low-cost business model: Network implications of fare bundling and connecting flights in Europe. *Journal of Air Transport Management*, 42, pp.289-296.
- Feng, B., Li, Y. and Shen, Z.J.M., 2015. Air cargo operations: Literature review and comparison with practices. *Transportation Research Part C: Emerging Technologies*, 56, pp.263-280.
- Feng, B., Li, Y. and Shen, Z.J.M., 2015. Air cargo operations: Literature review and comparison with practices. *Transportation Research Part C: Emerging Technologies*, 56, pp.263-280.
- Fontana, A. and Prokos, A.H., 2016. *The interview: From formal to postmodern*. Routledge.
- Gillen, D. and Morrison, W.G., 2015. Aviation security: Costing, pricing, finance and performance. *Journal of Air Transport Management*, 48, pp.1-12.
- Gross, S. and Lück, M. eds., 2016. *The low cost carrier worldwide*. Routledge.

- Halttunen, S., 2017. Airport marketing trends: the impact on customer experience at Helsinki-Vantaa Airport.
- Hill, E., LaNore, M. and Véronneau, S., 2015. Northern sea route: an overview of transportation risks, safety, and security. *Journal of transportation security*, 8(3-4), pp.69-78.
- Huang, K. and Lu, H., 2015. A linear programming-based method for the network revenue management problem of air cargo. *Transportation Research Procedia*, 7, pp.459-473.
- Huber, T., Telair International GmbH, 2016. *Cargo loading system for loading and unloading a cargo item, method for creating and/or updating a loading plan*. U.S. Patent 9,382,004.
- Hüscherlath, K., Niemeier, H.M., Wolf, H., Gillen, D. and Forsyth, P. eds., 2013. *Liberalization in aviation: competition, cooperation and public policy*. Ashgate Publishing, Ltd
- Jiang, G., Feng, D. and Zhu, W., 2017. A large and heavy cargo transport system designed for small and medium ship maintenance and repair. *Journal of Ship Production and Design*, 33(3), pp.212-220.
- Kristjanpoller, W.D. and Concha, D., 2016. Impact of fuel price fluctuations on airline stock returns. *Applied energy*, 178, pp.496-504.
- Law, A.A., Threlfall, M.E., Tijman, B.A., Anderson, E.M., McCann, S., Searing, G. and Bradbeer, D., 2017. Diet and prey selection of Barn Swallows (*Hirundo rustica*) at Vancouver International Airport. *The Canadian Field-Naturalist*, 131(1), pp.26-31.
- Lawton, T.C., 2017. *Cleared for take-off: Structure and strategy in the low fare airline business*. Routledge.
- Levinson, M., 2016. *The Box: How the Shipping Container Made the World Smaller and the World Economy Bigger-with a new chapter by the author*. Princeton University Press.
- Lin, J.T., Shih, P.H., Huang, E. and Chiu, C.C., 2015, March. Airport baggage handling system simulation modeling using SysML. In *2015 International Conference on Industrial*

- Mahmoud, M., 2017. *Exploring the Experiences of Arab Students at Vancouver Island University in Nanaimo, British Columbia* (Doctoral dissertation, Electronic version published by Vancouver Island University).
- McCusker, K. and Gunaydin, S., 2015. Research using qualitative, quantitative or mixed methods and choice based on the research. *Perfusion*, 30(7), pp.537-542.
- McKenney, S. and Reeves, T.C., 2018. *Conducting educational design research*. Routledge.
- Mitzenmacher, M. and Upfal, E., 2017. *Probability and computing: Randomization and probabilistic techniques in algorithms and data analysis*. Cambridge university press.
- Morrison, W. and Gillen, D.W., 2017. Airport pricing, financing and policy: report to national transportation act review committee. In *The economic regulation of airports* (pp. 45-62). Routledge.
- Oliveira, A.V., 2017. An empirical model of low-cost carrier entry. In *Low Cost Carriers* (pp. 89-112). Routledge.
- Olariaga, O.D., 2018. Airport competition, general framework of analysis. *Dimensión Empresarial*, 17(1), pp.77-89.
- Otte, T., Metzner, N., Lipp, J., Schwienhorst, M.S., Solvay, A.F. and Meisen, T., 2018, September. User-centered Integration of Automated Air Mobility into Urban Transportation Networks. In *2018 IEEE/AIAA 37th Digital Avionics Systems Conference (DASC)* (pp. 1-10). IEEE.
- 
- Quarter, J., Mook, L. and Armstrong, A., 2017. *Understanding the social economy: A Canadian perspective*. University of Toronto Press.
- Radushinsky, D., Mottaeva, A., Andreeva, L. and Dyakova, G., 2017, October. The evaluation of the modernization cost of the transport infrastructure of the Northern Sea Route in the Arctic zone of the Russian Federation. In *IOP Conference Series: Earth and Environmental Science* (Vol. 90, No. 1, p. 012137). IOP Publishing.
- Schiller, P.L. and Kenworthy, J.R., 2017. *An introduction to sustainable transportation: Policy, planning and implementation*. Routledge.

- Schmitt, D. and Gollnick, V., 2016. The Air Transport System. In *Air Transport System* (pp. 1-17). Springer, Vienna.
- Shaw, S., 2016. *Airline marketing and management*. Routledge.
- Shortt, C. and O'Brien, J. eds., 2016. *Handbook of functional dairy products*. CRC Press.
- Spinelli, C.B., Offer, B.W., Bruce, A.E., Lusardi, R. and Cuspard, S.F., Boeing Co, 2016. *Determining landing sites for aircraft*. U.S. Patent 9,520,066.
- Statcan.gc.ca. (2019). *Statistics Canada: Canada's national statistical agency*. [online] Available at: <https://www.statcan.gc.ca/eng/start> [Accessed 28 Apr. 2019].
- Taneja, N.K., 2016. *Airline Industry: Poised for Disruptive Innovation?*. Routledge.
- Taneja, N.K., 2016. *Looking beyond the runway: Airlines innovating with best practices while facing realities*. Routledge.
- Taylor, G.R., 2015. *The transportation revolution, 1815-60*. Routledge.
- Taylor, S.J., Bogdan, R. and DeVault, M., 2015. *Introduction to qualitative research methods: A guidebook and resource*. John Wiley & Sons.
- Tc.gc.ca. (2019). *Transportation in Canada 2016 - Transport Canada*. [online] Available at: <https://www.tc.gc.ca/eng/policy/transportation-canada-2016.html#the-role-of-transportation-in-the-economy> [Accessed 28 Apr. 2019].
- Tetra Tech, E.B.A., 2016. CAMPBELL RIVER AIRPORT AIRPORT MASTER PLAN.
- Thubagere, A.J., Li, W., Johnson, R.F., Chen, Z., Doroudi, S., Lee, Y.L., Izatt, G., Wittman, S., Srinivas, N., Woods, D. and Winfree, E., 2017. A cargo-sorting DNA robot. *Science*, 357(6356), p.eaan6558.
- Quinlan, C., Babin, B., Carr, J. and Griffin, M., 2019. *Business research methods*. South Western Cengage.
- Wensveen, J., 2018. *Air transportation: A management perspective*. Routledge.

# **ANNEXURE**

## Terminologies

**Integrators:** A company that offers an integrated door to door service, normally using their own fleet of aircraft and road vehicles.

**Air Freight Forwarder:** A company responsible for arranging the entire shipment of goods from A to B using a range of transport providers.

**Payload:** The total weight of people and cargo carried on an aircraft

**Unit Load Device:** A container or pallet used to load freight and luggage on wide-body and some types of narrow-body freighter aircraft.

**All Cargo operators:** All Cargo operators are the ones providing point to point services

## Transcript

**Skype Conversation:** Manager Interview (Prefer not to be named), addressed as A and me addressed as B

**B:** Thank you for your time.

A: You are welcome but we have to be fast, I am compressed on time.

B: Sure, I will try my best.

A: Go ahead

B: I am doing a project related to air Cargo, so I have some questions related to same as stated in my recent email to you.

A: I remember about it.

B: What is your current role in relation to the airport?

A: I am dealing within operations.

B: What duties are carried out as operations manager?

A: I handle various operations in the airport and route planning.

B: In relation to planning routes do you take any consideration on cargo?

A: We are a relatively very new and small airport so we have almost no cargo.

B: Are there any cargo facilities at the airport?

A: Right now, no we have a very small area for the cargo.

B: And may I ask why?

A: Our main focus is to facilitate the passengers at present.

B: In my knowledge, the airport is currently expanding. In future will cargo be a part of this plan?

A: The Nanaimo airport is trying to establish a working partnership with DP World for its air cargo facilities and we are thinking of express deliveries.

B: Do you think the airport would benefit from it?

A: Maybe, I do not know a lot about it.

B: Do you have any additional comments

A: Well we are more thinking of passengers because most of the people using the airport are international students and tourists. I have to leave soon.

B: Sure and one last question- Could you recommend anyone I could speak with at the airport over Skype or who can answer my emails?

A: Eh. I am not sure. If you were here it was much easier but I would say you should contact our HR manager and she can put you in contact with the right person.

B: All right, thank you so much for your time.

A: No problem. I hope this can help you.

B: Yes indeed.

A: Good luck with your project. See you in Nanaimo soon. Bye Bye.

### **Skype Interview number 2: AIRPORT OFFICIAL (A)**

ME (B) Hello.

(A). Hello. How are you doing?

(B): I am fine thank you. Can we begin the interview?

(A): Yes: Can you brief me quickly about your project.

(B): Yes. I am doing a project as a part of my master thesis. It is actually if it will be beneficial for the Nanaimo Airport to have Cargo.

(A): Oh yes ok I got it now. I have gone through your email. But as far I remember you were coming here in March to conduct some studies?

(B): Yes, I was but I still haven't gotten my visa fixed for Canada. I cannot travel without it. I have to deliver my project in 3-4 weeks from now so, I thought this might help.

(A) Ahh. Okay. Now I understand. But you wrote you are taking your education in Denmark?

(B) Yes I am. From Aalborg University, Denmark.

(A) Yes Yes I know Denmark. We are at war with Denmark over an island and Denmark has almost as crazy weather as Canada. (Laughs)

But I think from Denmark you can travel on an e visa. It takes 24 hours to go through.

(B) Well I am an Indian nationalist so I need a tourist visa or a visitor visa to travel. From here it will almost take 2 months for my application to be processed.

(A) Ok I see. Let's begin with your questions.

(B) Thank you.

(B) What is your current role in relation to the airport?

(A) I am working as \*\*\*\*\* (does not want to disclose the information).

(B) Can you tell me something about the Airport and how long have you been associated with the airport.

(A) Yes. I am here since 2010. When I joined the activities at the airport were not that high but in past 5 years there are a lot of passengers coming and eventually the number of flights has also increased.

(B) What airlines are generally flying?

(A) Air Canada and West Jet

(B) Are these domestic or international

(A) So far we have only domestic.

(B) Are there any cargo facilities at the airport?

(A) Air cargo you mean?

(B) Yes.

(A). No we have no cargo. Very rare it happens that we receive any packages or parcel

(B) And why do you think is that?

(A) Well, I think Vancouver Airport is very close to here and there most of the cargo is handled. Then we have a port and everyday 2-4 ferries run from Nanaimo to Vancouver. May be because of that.

(B) Do you think there could be a possibility of cargo operations at Nanaimo Airport?

(A) Oh that is very hard to say. For now the terminal building and the lounge are under construction. We have received funds from 2 different bodies to expand and facilitate the passenger terminal. As far in my knowledge the government of Canada has not equally distributed the expenditure across all the modes. The freight by sea as in traditional days occupies most of the attention. Air Cargo is also important and the government of various states needs to understand so.

(B) What kind of changes do you think could be beneficial at Nanaimo Airport in relation to the cargo?

(A) Well any change if it is in good of the airport is beneficial. I cannot say a lot about cargo. There are a lot of activities going during winter in the area. Many tourists visit. So I think something for the passengers is definitely better. Place to eat, to sit while waiting etc. But any change is hard. It is hard to make any decisions. Many verticals have to be considered. Among others the political situation in the area is always an issue. It takes long before a decision could be made. Since everything in this industry changes so fast, sometimes it is too late to implement the decisions thus made.

(B) ok, thank you for your time.