

Bachelor's Thesis

THE IMPACT OF COVID-19 ON THE AIR CARGO MARKET IN EUROPE

Institution: Zurich University of Applied Sciences

Department: ZHAW - School of Management and Law

Study Program: Bachelor of Science (BSc) in International Management

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Submission Date: 5 September 2021

Management Summary

The world faced unprecedented times after the coronavirus pandemic began in January 2020. With travel restrictions and mandatory quarantine, the aviation industry suffered immensely, as the majority of airlines had to cancel commercial flights all around the globe. Medical supplies to treat infected people experienced a vast surge in demand, which required a rapid transportation mode. Consequently, the rapid delivery of such time-sensitive products was ensured through transportation via air.

This thesis draws its attention to the impact of COVID-19 on the air cargo market and the subsequent import and export of goods of Europe. The cargo market heavily depends on passenger flights, as about half of the total air freight volume is carried by passenger flights. The drastic reduction of belly capacity caused significant difficulties among the industry, as the demand for capacity increased rapidly despite supply chain disruptions. However, given Europe's extensive roadmap network, road trucking might be another alternative. Hence, the main objective of this research is to determine whether trucking services can replace the loss of capacity of air cargo. Subsequently, other types of transportation modes that are viable in the future after an industry recovery are described.

The essential data were obtained through a literature review on air cargo operations and the impact of COVID-19 in Europe. To demonstrate the development of air freight during the past years, market data about air cargo volume in Europe between 2010 until 2020 are illustrated. Feasible perspectives were conducted empirically through interviews with experts operating in the aviation industry.

Contrary to the assumption that the increasing road connectivity in Europe led to a shift from air to road shipments, the considerable amount of secondary data did not indicate an accurate response to this hypothesis. Consequently, the main conclusions of the thesis are based on the answers given by the interviewees. Essentially, two conclusions can be drawn – first, the significant shift from belly-load aircraft to full-freighter fleets. Secondly, the adaption of the remodeled passenger flights to increase capacity for goods. Concerning the alternative transportation modes, the findings indicate that sea freight shipments are not the only reliable alternative, and rail transportation is increasing simultaneously.

Concluding, the research indicates that improvement is possible in each segment of transportation mode. Most notably, the recommendations for future operations in a post-pandemic era suggest that the railway network in Europe should be expanded to relieve truck traffic. Additionally, sea shipments for non-time-sensitive goods help to maintain the total capacity of the newly remodeled freighters and freighters.

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List of Abbreviations and Definitions

FTK / CTK	Freight-Tonne-Kilometres, which measure the actual freight traffic and is also known as Cargo Tonne Kilometres (CTK). It measures one metric tonne of revenue load which is flown for one kilometer (Lai, 2014).
IATA	The IATA (IATA, n.d.), short for the International Air Transport Association, represents around 290 airlines or also 82% of total air traffic on a global level. Furthermore, they assist aviation activities in many areas, which also include formulating industry policies as well as critical aviation issues.
ICAO	The ICAO (ICAO, n.d.) is supported and guided by 193 national governments in order to assist their diplomacy and collaboration in air transportation as signatory states of the Chicago Convention (1944). In particular, they are not an international aviation regulator, as they do not have any authority over national governments in the areas of international priority they are established for.
Integrator	According to Bendiksen (2016), there is a distinguishing difference between freight forwarders and integrators. In particular, besides organizing deliveries, they also own the asset, such as FedEx or UPS.
RFS	The road feeder service involves the transportation of cargo by trucks, but instructed by the airlines, from regional airports to bigger cargo airports (Cieplinska, 2018).
ULD	Unit Load Devices are encountered in three different forms on the aircraft. Either as an aircraft pallet, a pallet-net combination or as an aircraft container (IATA, n.d.). In particular, those devices are the only removable parts belonging to an aircraft, which also leave the control of an airline and return after going through various parties. In addition, ground handling providers are usually operating the majority of those ULD's and pass them on until they return to the airline at some point.

1 Introduction

The coronavirus, a topic which is in everyone's ears and mouth for more than a year now. The consequent restrictions from various governments globally have caused many difficulties for the aviation industry. This thesis is going to be introduced with this chapter, where the problem statement will be further elaborated as a first instance. The research questions will be presented in the next subchapter, followed by a short outline of the whole thesis in the last subchapter of this section.

1.1 Problem Statement

The coronavirus was first detected back in December 2019 and began to spread from China to other countries in Asia, ending up infecting all parts of the world. The coronavirus, known as COVID-19, was identified on the European continent, starting from the month of late February to the beginning of March 2020 (World Health Organization, 2021). As a result, flights leaving Europe for China had to be canceled beginning as early as January 2020, as the governments were implementing travel restrictions and social distancing measures (EU/Schengen, 2020).

On March 11th, 2020, the World Health Organization (WHO) declared the coronavirus a pandemic, emphasizing over 118,000 confirmed cases in over 110 countries and terrains around the globe and the consistent risk of a worldwide spread (Ducharme, 2020). The extensive impact throughout the whole world from March until today was not imaginable from the beginning. Several restrictions have been enforced on the airline industry which have subsequently caused a significant decrease in the number of travelers worldwide. (Niestadt, 2020). Consequently, this will have a long-term impact on the whole industry in which recovery is not in sight. Due to China's strict lockdown at the onset of the virus, the global supply chain has been substantially interrupted and suffered tremendously under the pandemic circumstances, as the manufacturing and production companies, which are the suppliers for many businesses worldwide, were forced to stay on hold (Prescott, 2020).

Furthermore, as Niestadt (2020) mentioned, many airlines have combined passenger as well as air cargo operations into their business strategy. However, due to the impact of this pandemic, the air cargo operations were proven to create additional revenue during this period, as people were forced to stay inside and thus pursued ordering online through the e-commerce

sector as their only alternative. Additionally, with the rising urgency in research of a suitable and effective vaccine and the increasing demand for medical supplies, air cargo operations have been in high demand since the beginning of the pandemic to transport the freight as fast as possible. Therefore, the air freight division had to be adjusted to this demand by also reconstructing the passenger compartments into cargo suitable spaces to offer enough supply for the required demand.

Moreover, due to the fact that the airlines had to react accordingly to the travel restrictions worldwide, numerous passenger flights had to be canceled. As of April 2020, air travel decreased by 94% at its peak (The Economist, 2021). As around 50% of the passenger flights were accounting for the overall cargo volume (IATA Economics, 2020), the capacity of flights that were offered was simply too low to fulfill the transportation demand. Hence, alternatives had to be found to serve the European market with goods.

Additionally, as the availability of operating flights was substantially low, an increase in the freight rate was necessary to compensate for the loss from the passenger business. However, as land transportation serves as one of the alternatives for the European market, it has also been heavily affected by restrictions, such as closed borders from various countries, sanitary measurements, and long waiting hours along the way. Nevertheless, land transportation did not have to deal with such severe shocks compared to air freight operations (World Trade Organization, 2020).

1.2 Research Question

Following the introduction given in the previous chapter, this paper will analyze the development of the following two transportation modes: air cargo and road freight. The import and export of goods in Europe during the pandemic will be examined since the air freight traffic within Europe is nearly non-existent due to the distinct network on the surface. As the travel restrictions have not only limited cargo operations in Europe but also globally, alternatives had to be found in order to maintain the transportation chain. One alternative to air freight is the road transportation mode, which has established itself as a strong and reliable method in the European region. Moreover, as this region is predominantly connected via the mainland, all European countries can therefore be served on land. However, one must not forget, besides posing limitations on air cargo operations, the pandemic also impacted road transportation, as road freight operators had to face similar restrictions due to unexpected lockdowns.

While the majority of freight in Europe is transported as a side business on passenger fleets, alternatives had to be found to still maintain the supply chain and deliver the desired supplies. Therefore, a hypothesis is proposed which claims that there was a shift from the air cargo market to the road freight sector, as passenger flights were not operating anymore.

Accordingly, two specific research questions are addressed throughout this bachelor thesis:

1. Was there a distinguishable shift from the air cargo to the road freight operations in the European market visible as a consequence of COVID-19?
2. What kind of alternatives in the transportation sector are possible and sustainable for the European market after the economy has potentially recovered from COVID-19?

Considering the market data, a logical and obvious conclusion should be reached. With the questionnaires administered to the interviewees and their responses, the writer's opinion might either remain unchanged or change under the influence of the expert's inputs. That information will be used to further draw scenarios and develop a recommendation for cargo transportation in Europe for the future.

1.3 Purpose of Research and Outline

In accordance with the previously mentioned research questions, the purpose of this bachelor thesis is to find out if a distinguishable shift from air cargo to road freight operations happened as a result of the impact of the coronavirus. Also, if there are other opportunities and alternatives possible for companies, using other transportation modes than air cargo after the potential recovery of this crisis. Considering the current circumstances, the recovery of this crisis is comparable to a rollercoaster ride. There have been improvements, significant improvements in different countries where nations were put into complete lockdowns and were able to go back to normal reality, such for example Australia (Australian Government Department of Health, n.d.) or New Zealand (Ministry of Health, n.d.). But also, setbacks, such for example the continent Europe (European Centre for Disease Prevention and Control, 2019) with high rising numbers starting again from October 2020.

However, from the beginning of this crisis, the air cargo operations owned a very high position, as they were the only carriers offering the ability to transport medical supplies as fast as possible to desired destinations worldwide. Thus, understanding the importance of air cargo operations as well as its connectivity to road freight transportation is a crucial objective in order to understand the impact of the coronavirus as well as the imposed restrictions and measurements imposed by numerous governments on the globe. Finally, only by knowing the current status of innovations and developments in response to the crisis, one can potentially predict if a shift indeed happened from air to road and what kind of alternatives are possible to potentially predict future opportunities for the transportation sector in Europe.

This bachelor thesis is organized as follows. Chapter two provides a brief overview and introduction about the main transportation modes with a deeper focus on air cargo, the connected importance of trucking as well as an oversight about the coronavirus in Europe. Furthermore, chapter three describes the methodology of this paper divided into two different parts and approaches. Chapter four covers the findings, which on one hand delivers the analysis of the market data and on the other evaluates the conducted interviews more thoroughly. Followed by chapter five with a discussion about the findings, where the results are critically questioned. This thesis closes up with the conclusion in chapter six, followed by the references in chapter seven as well as the appendix in chapter eight, containing all interview transcripts as well as the respective coding table.

2 Literature Review

To further understand the importance of the different transportation modes in the global supply chain, this thesis demonstrates various aspects of the two main means of transportation in the following chapters. This chapter is structured as follows: Firstly, an overview of the four main shipping forms will be given. Afterward, a deeper dive into the air cargo operations will provide a summary of its characteristics and benefits as well as disadvantages. Furthermore, the importance of trucking in the aviation sector, as well as its network in the European region, will be illustrated. And finally, the impact of the coronavirus and its responses from the airline industry will be provided as a last subchapter in this section.

2.1 Transportation Modes

Three terms play a central role in the topic of this Bachelor's thesis: logistics, distribution, and transport, where their meaning can differ in many ways, conditional on the context they are used in.

According to Bektas (2017, p. 3), and for the purpose of this thesis, each can be defined in the following manner. Transport refers to the physical act of moving a certain good from its starting point to its destination, combined with the usage of a selected transportation vehicle as well as a transportation infrastructure. Distribution is defined by all activities which are related to the physical placement of goods (hence it is inclusive of transportation on one side and warehousing on the other). Lastly, logistics is a term that is normally used to describe the overall process involving all relevant activities to move a good from one location to its final destination, factoring in the processes of production and distribution as well. Bektas (2017, p. 1) also held that movement should not only be understood in the terms of physical movement but also as the flow of information. This also helps to ensure that customers' requirements are met in the most efficient way (Murphy Jr. & Knemeyer, 2018, p. 21).

As mentioned above, there are several means or modes of transportation possible: by air (using cargo planes), land (including road, rail, and off-road), as well as by water (either on ships in the oceans or barges on rivers) (Bektas, 2017, p. 3). According to Murphy and Knemeyer (2018, p. 224), air cargo is an expensive mode of transportation, where freight is transported either in the belly of a passenger plane or in full freighters. Most suitable goods

which are transported by air are either high in value, require urgent or a time-specific delivery, or are considered as perishable goods.

As claimed by Bektas (2017, p. 3), the most commonly used mode of transportation mode has been and continues to be road transport. The main reason for its popular reputation is the offer of a very quick service as well as being flexible and available on demand. However, according to Sarder (2021, p. 19), transporting shipments by truck is relatively low in cost but has to abide by multiple regulatory guidelines depending on the region they are operating in. Another type of land transportation next to road transport is rail. As stated by the author (Sarder, 2021, p. 20), this mode of transportation is chosen by companies who need to transport their goods over long distances and are not concerned about the time frame. Furthermore, it is offered at a low cost, is efficient as well as environmental-friendly.

As Pilkington (2020) claimed, sea freight is a means of transportation to move large amounts of goods by using carrier ships, where goods are loaded in containers, which are afterward loaded on vessels. While typical cargo ships can transport around 18,000 containers at once, it is the type of transportation that is not only cost-efficient but also able to carry high quantities over a long distance. However, as the author (Pilkington, 2020) mentioned one of the disadvantages of this method is time, as it requires the most amount of time as it is the slowest opportunity to transport goods.

However, as highlighted before in the research question, this thesis concentrates solely on two specific transportation modes, such as air cargo and road freight, which will be further explained in the next chapters.

2.1.1 Air Cargo

According to O'Connor (2001, p. 153), the term *air cargo* is commonly used in a broad sense, including virtually everything that fits into a cargo compartment of either a passenger aircraft or a full freighter. While it operates as a side business compared to the passenger business, the status of air freight should not be mistakenly underestimated. There are some distinguishable characteristics between the cargo as well as passenger business available; while air cargo is practically always one-way, passengers do usually own a roundtrip ticket. Moreover, air cargo is a passive object which needs to be physically moved, loaded, and unloaded whereas a passenger can move by himself. Many manufacturers are relying on the delivery of its

components, as they can be time-sensitive rather than price-sensitive or are considered as a perishable good that needs to be transported far away in a short amount of time.

2.1.1.1 Air Cargo as a Transportation Mode

Living in a world where time dictates our daily lives also has a high significance in the global supply chain. As Sales (2016, p. 2) states, in almost every type of modern industry and business, goods can be transported in many ways, some of which may take longer than others. Therefore, integrated connectivity is an important factor for the global supply chain.

Sales (2016, p. 5) mentioned the effect of the introduction of the internet which has changed the manufacturing and distribution behavior worldwide. Not only does the “I want it now” culture demand a very short reaction time of all involved parties, but it also results in a higher demand for optimal efficiency in terms of distribution and delivery of the product. The air cargo industry had to adapt to those fast-moving changes as well. Those changes have been connected to new rules, technologies, as well as market demands. Nevertheless, the security level has been improved continuously which can lead to a slower processing time of handling goods.

Nevertheless, a certain group of goods can take time to be delivered, whereas different others need a quicker solution (Sales, 2016, p. 6). Examples are fruits and vegetables, electronic or electrical equipment, or machines (Murphy Jr. & Knemeyer, 2018, p. 225). Sales (2016, p. 6) found that air cargo operations offer the following selling points to the supply chain:

- Just-in-time (JIT) production cuts the amount of inventory and cost-intensive warehousing due to fast transportation time.
- For some goods, delivery time is crucial as the value of the shipment is either high or exposed to the risk of theft, counterfeiting, or temperature sensitivity.
- Fast delivery time of certain spare parts is substantial to maintain a mechanical process running. The longer the machines are out of order, the more losses are going to be generated.
- Pharmaceuticals and perishables need rapid and temperature-controlled surroundings. However, the requirements for the health regulations have to be fulfilled at the same time.

The authors Budd and Ison (2017, p. 252) described the air cargo operation as the most suitable method to transport your goods from your starting point to your destination if you are under time pressure. Additionally, combined with the time pressure, if your product is dimensionally too large and transport by rail or road is not possible, then airfreight is your only option. Needless to say, for shippers who choose air cargo as their transportation mode, speed is crucial and this comes at a price (Sales, 2016, p. 6). Thus, the demand for air cargo depends on goods that not only require a speedy transportation mode but also demonstrate a cost advantage compared to alternative modes of transportation (Holloway, 2008, p. 535).

However, air cargo operation also has essential aspects which need to be considered before deciding if the air freight method makes the most sense to transport a certain good. According to Budd and Ison (2017, pp. 251-252), the following key characteristics play a significant role in determining whether or not a product should be shipped by air.

Firstly, the high value-to-weight ratio: As space is very limited on aircraft, airlines are calculating their charges based on the cargo's dimensional as well as volumetric weight. Hence, while heavier products are determined based on their actual weight, less dense products (which consume substantial space) will be very costly to be shipped by air, regardless of the lower weight. Secondly, as mentioned previously, time is a very important aspect in the whole air cargo operations. Time-sensitive products have a drastic decrease in their value as the time horizon decreases. For instance, fresh products (such as seafood or certain pharmaceutical products) have a limited shelf life and deteriorate over time.

The last key characteristic is determined by the uncertain demand. Sometimes it is unavoidable that parts in a company's operation break down and the only opportunity to repair the machines is only possible through ordering a certain part, which is located in another country or even on another continent. However, as air freight offers the fastest means to get those required parts delivered, one has to accept the high costs of transporting the necessary parts by air.

Nevertheless, even if one product corresponds with all those different characteristics, it may still not be shipped by air. The distance between its origin and destination, relative speed, as well as the degree of difficulty posed by the transportation mode itself need to be taken into

consideration. If either rail or road is deemed more cost-effective as well as faster than air, these methods will most likely be preferred over air freight.

2.1.1.2 The Variety of Commodities

According to Boeing (2020, p. 14), there is a range of different transportation modes available in order to deliver a certain good from its starting point to the destination. However, shippers are only able to choose between two options for intercontinental freight, namely air and maritime. While maritime transport offers a benefit in regards to low cost, it also has its disadvantages (Boeing, 2020, p. 14), which is the duration its transports take to arrive at the destination. In particular, the authors (Häberle & Stölzle, 2020, p. 23) mentioned the transport by air profits from speed as well as reliability, making airfreight the most rapid method of long-distance transports on an intercontinental level and enjoys the indispensable status for many companies. Comparing the volume transported, the world maritime sector transported around 11.9 billion tonnes, whereas the air cargo industry accumulated to 60.9 million tonnes (Boeing, 2020, p. 14).

Given the following graph (Figure 1) provided by Boeing (2020, p. 14), it is visible that maritime transportation takes up a big part of the commodities, which use dry as well as liquid bulks to transport raw materials and other bulk items. Unlike iron and oreas of other metals, coal, grains, and cement are transported in dry bulks; items such as crude oil or petroleum are carried in specified liquid bulks and therefore account for the biggest part of the world trade tonnage.

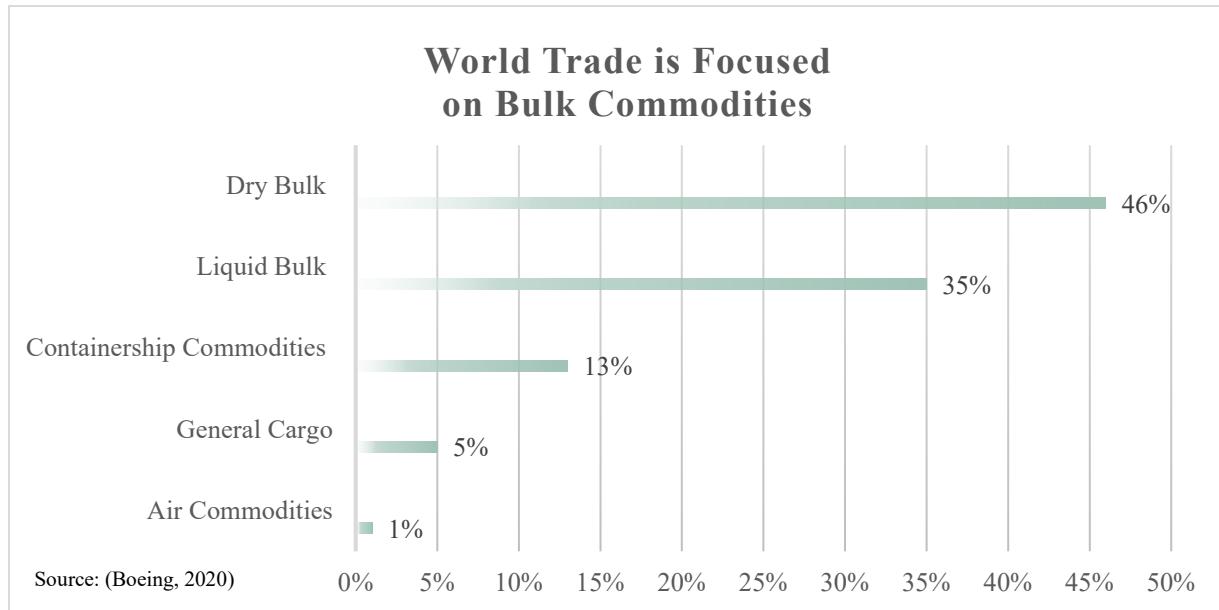


Figure 1: World Trade According to Commodities

Even though air freight only entails less than 1% of the world trade shipments by tonnage, it represents around 35% of global trade by its value (Shephard, Shingal, & Raj, 2016; p. 2 Boeing, 2018, p. 7). Those discrepancies between the value and tonnage can be explained by air freight's exclusive position in transporting time-sensitive, reliable, and secure goods. For instance, machinery, computing equipment, and electronic devices make up the highest share of airborne trade tonnage in comparison to the containership tonnage (Boeing, 2018, p. 7).

According to another report from Boeing (2020, p. 14), other classified air commodities include perishables, pharmaceuticals, and high-value electronics. Furthermore, wood products, perishables, automobiles, and specialty chemicals consist of the general cargo category. Consumer goods, machinery, textiles, fruits, and vegetables are transported by containerships. Moreover, natural resources such as crude oil, petroleum products, liquefied petroleum gas, liquefied natural gas, and other liquids are transported in liquid bulks (more specifically in the form of iron and ores of other metals, coal, grains, and cement in dry bulks. The majority of these commodities, such as grains, metal ores, and oil are low in value, non-time-sensitive, and therefore shipped by sea in dedicated bulk carriers.

2.1.1.3 Types of Methods to Transport the Air Commodities

According to the authors Morell and Klein (2019, pp. 82-83), the air cargo market can be separated into six different segments as the graph below (Figure 2) displays:



Figure 2: The Air Cargo Market

Scheduled all-cargo carriers solely operate as freighters as their main business and are hence specialized in the transport of air freight operations. Therefore, those carriers plan their schedule and sell their capacity based on the current air freight demand and are therefore independent of the influence of the passenger operations.

Charter cargo carriers do not have a scheduled network as their field of operations mainly relates to ad-hoc projects, disaster relief, military charters, and providing remote airport support. Integrated carriers like UPS and FedEx have been developed from the parcel services and operate all-cargo fleets coming in various sizes.

ACMI providers operate passenger or freighter aircraft in the name of other airlines. For this service, the aircraft, crew, maintenance, as well as insurance are covered by the lessor, who is also responsible for the fuel, landing, handling, and overflying. This service is also known under the definition of “wet-lease”. Moreover, *combination carriers* are airlines that offer and operate both types; on one hand, it operates the passenger aircraft and on the other, it is responsible for maintaining all-cargo fleets).

Finally, *passenger airlines* are carriers, which solely serve passenger aircraft and set their focus on selling the capacity of their belly compartment of those passenger aircraft as a side business. They account for around 20% of the international as well as domestic air cargo market, whereas they are responsible for only about 10% of the industry revenue. However,

almost all airlines that transport passengers also transport air cargo in the lower compartment of the passenger fleet.

Morell and Klein (2019, p. 87) found exceptions, such as European low-cost carriers (LCCs), who do not want to be confronted with the complexity of air cargo operations or regional airlines, whose space is limited onboard of their aircraft. In Table 1 (Morrell & Klein, 2019, p. 88), examples of low-cost carriers in Europe are presented, illustrating their respective cargo acceptance.

Table 1: World LCCs, Cargo Acceptance Policy, Examples (Morrell & Klein, 2019)

Airline	Cargo Acceptance
Ryanair	No
easyJet	No
Vueling	No
Norwegian	B737 / B787
Wizz Air	No

Generally, the authors Morell and Klein (2019) found that the European LCCs turn out to be more cautious about air cargo operations compared to other regions such as America, Asia, or the Middle East, in which airlines such as Southwest, JetBlue, or AirAsia offer cargo carriage services (p. 88). Several LLCs consider air freight in their business portfolio. However, the following examples demonstrate the reason why this kind of operation has still not been included. EasyJet tested the connection departing from London Gatwick back in 2010; Hungarian's Airline Wizz Air tried to analyze the inclusion of air freight operations into their business but was not able to find a suitable match for this activity. The only exception is Norwegian which offers air cargo carriage on the fleet of its long- as well as short-haul flights in operation using aircraft types Boeing 737-800 and B787.

During the application process concerning marginal pricing as well as assigning various costs for the operation of the aircraft (such as crew, maintenance, overflying, landing, fuel, and handling costs) to the passenger business, belly-operators can serve the market with aggressive rates. For instance, depending on the selected route, price of fuel, and aircraft type, the marginal

cost for one kilogram of freight transported on a passenger flight can be as low as 1/3 of the full price charged by another freighter service. Nonetheless, the choice of destinations and schedules of passenger flights depend on the demand by passengers and not by cargo. Hence, cargo departments who offer cargo carriers have to lower their rates to generate demand on poor freight routes which ultimately explains the low cargo load factors on passenger flights in comparison to freighters as well as its lower revenue contribution of passenger airlines. Nevertheless, Morrel and Klein (2019) stated, that while some airlines have never operated a full-freighter, others were rather unsuccessful and had to reduce their freighter aircraft as a consequence of the recession in 2009 to put their focus more on the lower-deck capacity of their passenger aircraft (p. 87).

However, as Boeing (2020) highlighted, there are two different opportunities for air cargo transportation, either full-freighters or the lower compartment of a passenger flight, both of which offer their advantages to involved parties (p. 9). Freighters are especially suitable for high-value goods as the transportation runs under an extremely controlled environment, direct routing options, reliability, and exclusive capacity applications. Those mentioned advantages allow airlines who operate freighters to offer a higher value of service standards while accomplishing more than 90% of the total revenue in the air cargo industry as shown in the following graph (Figure 3).

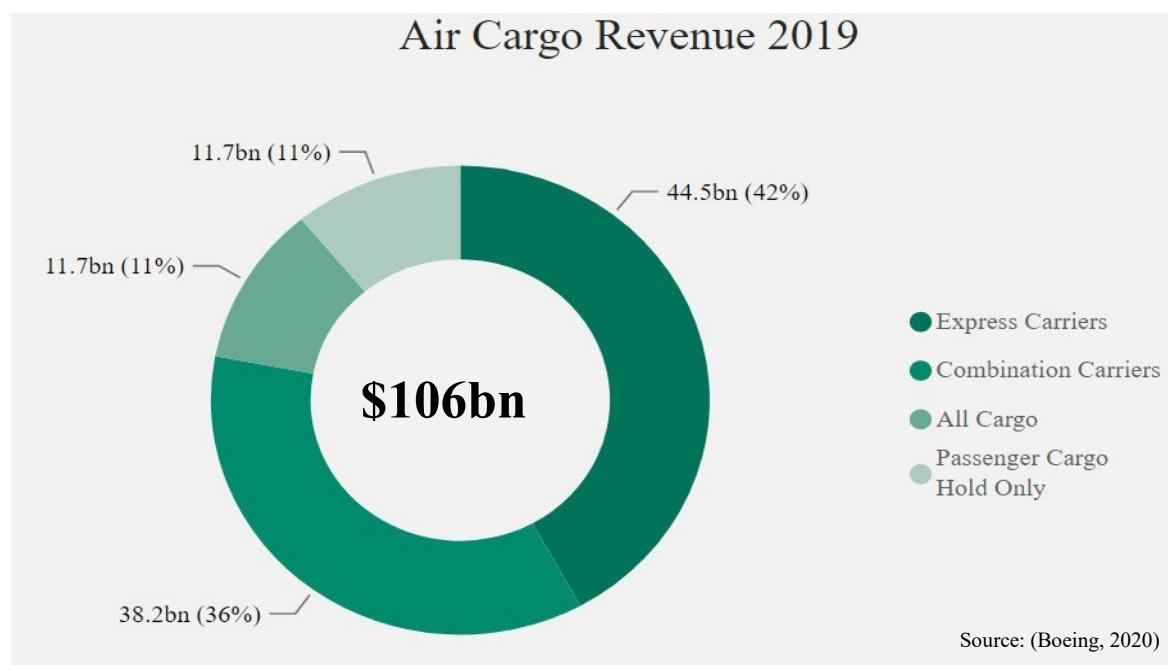


Figure 3: Air Cargo Revenue in 2019

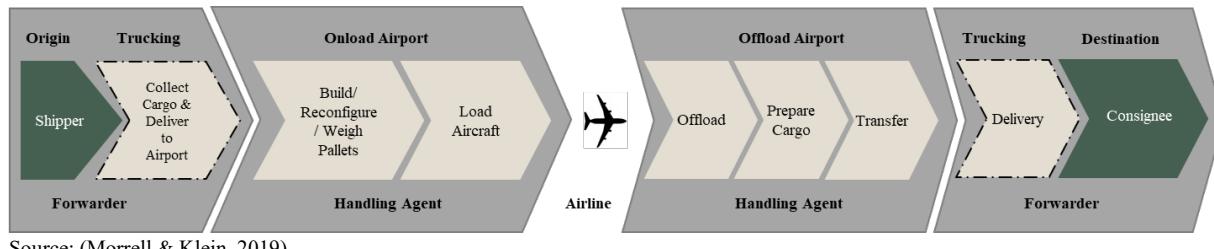
According to a forecast provided by Boeing (2018), the available network, and therefore the routes for freighters, are highly concentrated on a relative scale, available for only specific trade lines. The two longest trade routes are on one hand East Asia and North America, and on the other East Asia and Europe. On the contrary, passenger networks appear on a much broader level and are oftentimes offering destinations where the cargo demand is rather small. Those discrepancies between the passenger and air cargo traffic distribution explain the difference in load factors in belly space and freighters, which equate to, on average, 30% respectively 70% (p. 8).

Forecasts accounting for the future innovation of a new generation of widebody aircraft (offering larger capacities in the lower compartment) have the consequence that more and more airlines combine cargo transportation with their passenger operations to increase additional revenue opportunities. Those services offer a distinct value on non-cargo routes by filling dedicated freighter networks and administer new business occasions. Nevertheless, while the number of lower-hold capacity on long-haul flights in widebody airplanes increased by almost 6% in the past five years, the following limitations affect the cargo operations in the passenger aircraft:

- Reduction in height of lower deck can limit volumes
- Several security regulations and standards may restrict certain commodities to be transported on passenger flights

2.1.1.4 Position of the Airline in the Value Chain

Morrell and Klein (2019, p. 83) described the attributes of cargo airlines in the following graph (Figure 4), which demonstrates the position of the airline in the value chain.



Source: (Morrell & Klein, 2019)

Figure 4: Position of the Airline in the Value chain

The authors stated that, because shippers and consignees are typically not located at the airport, air freight is operating on a multi-modal or inter-modal level by its nature (Morrell & Klein, 2019, p. 45). This is ultimate because the shipments move from their origin to their

destination by various modes of transports, where every single mode has another carrier who is responsible. Traditionally, shipments are picked up and transported to an airport through a forwarding company, where the shipment is getting palletized and loaded to the respective aircraft. Afterward, the airline flies the freight to the destination airport, where the pallets are offloaded, broken down, and distributed to their respective destination in combination with the trucking service. Those trucking services operate under either a forwarding company or a flight number since this service is on the order of the airline (Morrell & Klein, 2019, p. 82).

As stated by the authors Heinitz, Hirschberger and Werstat, (2013), a rising part of airfreight is also transported by road, either during the delivery or pick-up of the goods at the airport which is integrated into the process. However, there are also truck services operating under substitutive freighter flights (namely “airline trucking”, “road feeder service (RFS)”, or “truck flights”) and that have a recognizably related flight number. As Häberle and Stölzle (2020, p. 16) found, those RFS are used as a feeder or defeeder service, either through space or cost incentives or under the circumstance that direct routes from individual airports are not feasible. This allows smaller airports to be linked to the international freight network via bigger European Hubs.

2.1.2 Road Freight

As shown in the previous subchapter, the trucking operation plays a significant role in transporting goods to and from the airports.

2.1.2.1 The Importance of Trucking

According to Bektas’ textbook (2017, p. 3), by defining the road transportation mode, it is a remarkable fact to mention that this method has been the most extensively used one on a domestic as well as a global level. The book found the main reason behind its high reputation is the ability to provide particularly fast service as well as the flexibility on being available on demand. The wide diversity of vehicles that are used are based on the size, capacity, weight as well as the type of energy. Another important aspect is the different kinds of road networks as well as the different regulations which are valid and counting in the respective countries those vehicles are passing by along the way. The author stated, that law enforcement not only restricts the driving and working hours but also regulates the driving time and obligates the drivers to take their mandatory breaks on a long-haul drive (Bektas, 2017, p. 4).

Sales (2016) claimed that trucking has gained high significance and is a vital part of the supply chain by delivering the shipments from the shipper's production site to the airport for the following exports or in the reverse orientation for the import. However, more than half of air cargo in Europe is traveling on designated vehicles to efficiently move the complete ULD's, which is allowing the minimization of costs as well as ensures that the temperature is controlled in case of perishable or pharmaceutical goods (p. 69).

The author (Sales, 2016) also described how meaningful trucking services are for keeping the global supply chain running, by illustrating the example of Iceland, where its volcano started to erupt in March 2010 (p. 69). In this case, the air traffic in the European network was standing still and the airlines were forced to keep their fleets on the ground to prevent any further catastrophe. Powerless to transport the goods by air freight, forwarders such as DHL, were trucking their goods to Turkey, where the ash cloud had not reached the land so far, in order to catch the next available flight abroad (Sales, 2016, p. 69). Such spontaneous and situation-related adjustments are only possible with flexible transportation modes (Bektas, 2017, p. 3).

2.1.2.2 Road Connectivity of Europe

According to a report from the European Commission (2019), transportation is an essential sector of the European economy, as it contributes to both the economic growth and movement of people and goods. While roads are the main transportation mode of freight transport, as well as the inland passenger in the European Union, building additional infrastructure as well as maintaining the whole road network to make the roads more accessible is essential for encouraging economic growth. Nevertheless, the network in some parts of the continent is still incomplete. For instance, the member states of central and eastern Europe are not well-operated by the east-west connections, not to mention the lack of connectivity between those regions (p. 4).

Furthermore, the report described a project (which started back in 1996) where the commission delivered guidance for the development of the TEN-T (Trans-European Transport Network), which has been amended in 2013, serving as the main strategic and implementing tool for the further development of this network (European Court of Auditors, 2019, p. 4). According to two other sources Euro Access Macro-Regions (n.d.) and the European Commission (n.d.), this network was designed to aim the connectivity within Europe. The EU

intends to build the core network until 2030, including inter alia and the expansion of cross-border connections as their focus. Furthermore, this network will be completed with a comprehensive network covering regional and national road networks to secure the connection between all involved parties.



Figure 5: TEN-T Core Network Corridors

The previously mentioned network is shown in the graph above, where nine core network corridors are represented, which cover almost the entire core network. Breaking those corridors down to their different coloration (European Commission, n.d.), the Atlantic corridors are yellow, followed by the green line to the Mediterranean. The middle marked in orange demonstrates the Rhine-Alpine route while being connected to the red corridors, the North Sea-Baltic. The purple corridors represent the North Sea-Mediterranean, while the pink line demonstrates the Scandinavian Mediterranean. Furthermore, the darker blue corridor connects the Baltic to the Adriatic while the light-blue line is the Rhine-Danube. Finally, the brown corridor connects the Orient-East-Mediterranean.

For the road transportation mode, the main indicator which is used by the commission is the total amount of km meeting the criteria for motorway or expressway road types. Furthermore, the length, as well as meeting criteria for such road classes, are further displayed in the following table (Table 2):

Table 2: The Nine Corridors of the Core Network (European Court of Auditors, 2019)

Corridor	Length of corridor road infrastructure	Meeting criteria for road class (motorways/expressways)
Atlantic	4'400 km	99%
Mediterranean	5'500 km	98%
North Sea-Baltic	4'100 km	70%
North Sea-Mediterranean	4'200 km	Fully compliant except for some last-mile connections to ports
Rhine - Alpine	1'700 km	Only one section not compliant
Scandinavian – Mediterranean	6'300 km	99%
Baltic – Adriatic	3'600 km	84%
Rhine – Danube	4'500 km	77%
Orient-East-Mediterranean	5'400 km	88%

However, as the European Commission (n.d.) states, on one side road transportation is regulated in the European Union and therefore based on common EU regulations. Although on the other side, there are countries that are not member states of the EU and hence count as a non-EU country. Those countries have bilateral agreements with the participating member states of the European Union. The author mentioned the following two agreements are essential as they further expand the whole European road transportation network:

- The agreement on the European Economic AREA (EEA Agreement) in terms of transport with Norway, Iceland, and Liechtenstein
- The agreement on land transport between the European Union and Switzerland

In particular, the EEA Agreement expands the internal EU market to Norway, Iceland as well as Liechtenstein. In relation to road transport, this enables the application of the EU road transport rules just like any other EU-member state to those three mentioned countries.

Moreover, the report from the European Commission (n.d.) found that the land transport agreement with Switzerland is not only covering goods to be transported by road and by rail, but also passengers. The agreement has been implemented back on July 1st, 2002, and aims to fully deregulate access to all involved parties in the transport markets. Concerning road transportation, in particular, forwarders either from the European Commission and Switzerland are already mutually eligible to operate between a member state of the EU and Switzerland. This agreement is an important one as almost 50 percent of all goods (which are transported between the EU and other third-world countries by road, including Switzerland). As of January 2005, Switzerland has adjusted the maximum allowed weight to 40 tons according to EU norms.

2.1.3 COVID-19 and the Air Cargo Industry in Europe

The following two subchapters will cover the impact of the Coronavirus on the air cargo market as well as the subsequent reactions of the airlines in Europe to keep their operations running. As the majority of passenger flights had to be canceled, alternatives had to be found to keep the global supply chain running.

2.1.3.1 The Influence of COVID-19

As Niestadt (2020) described in a report from the European Parliament, as a result of the quickly spreading virus, various governments had to react and consequently took a variety of restrictive measurements. Those restrictions had a huge impact on air transport, as they included travel and flight bans, quarantines, lockdowns, and local shutdowns to enforce social distancing. However, according to Eurocontrol (2020) statistics, Europe has proven to be one of the most affected regions worldwide. The number of passenger flights in the European airspace decreased by nearly 90% from March to April 2020 compared to the same period in the previous year. For example, the capacity of the routes from Europe to North America went down by 52% and 30% from Asia Pacific to Europe (Flexport, 2020).

According to Buyck (2020) due to the increasing demand for medical supplies, airlines implemented strategies to continue the transportation of cargo and maintain the global supply chain. However, sometimes those airlines had to face uncooperative governments. Hence the

European Commission supported IATA by requesting new guidelines in order to keep the transportation chain flow. As part of the new procedure, member states of the European Union are asked to authorize momentary traffic rights for further cargo operations from external EU restrictions, even if those operations were conducted with a passenger fleet.

Furthermore, mentioned in a study conducted by Häberle and Stölzle (2020, p. 74), more than 50% of the world's air cargo is carried as belly capacity on passenger flights, which poses a direct link between the grounding of passenger aircraft and the preservation of air cargo operations. In particular, with the implementation of political measurements concerning the corona crisis, air cargo operations have rapidly moved into the spotlight as an essential transportation mode to deliver the demanded supply of urgently needed goods. As a result, the steep increase in demand for protective supplies confirms the great importance of air cargo under time-sensitive and long-distanced circumstances (O'Bryne, 2020).

Another consequence was the increasing air freight rates caused by the limited capacity of operating passenger flights. As the following graph (Figure 6) from Statista (2021), which used data from Air Cargo News, illustrates on an example of different routes, air freight rates drastically increased beginning March 2020 and reached their peak in May 2020, followed by another decrease in July 2020. However, by that time, more passenger flights were available. According to IATA (2020), the further increase at the end of the year was due to, once again, a surge in COVID-19 cases which led to renewed lockdowns and restrictive measurements.

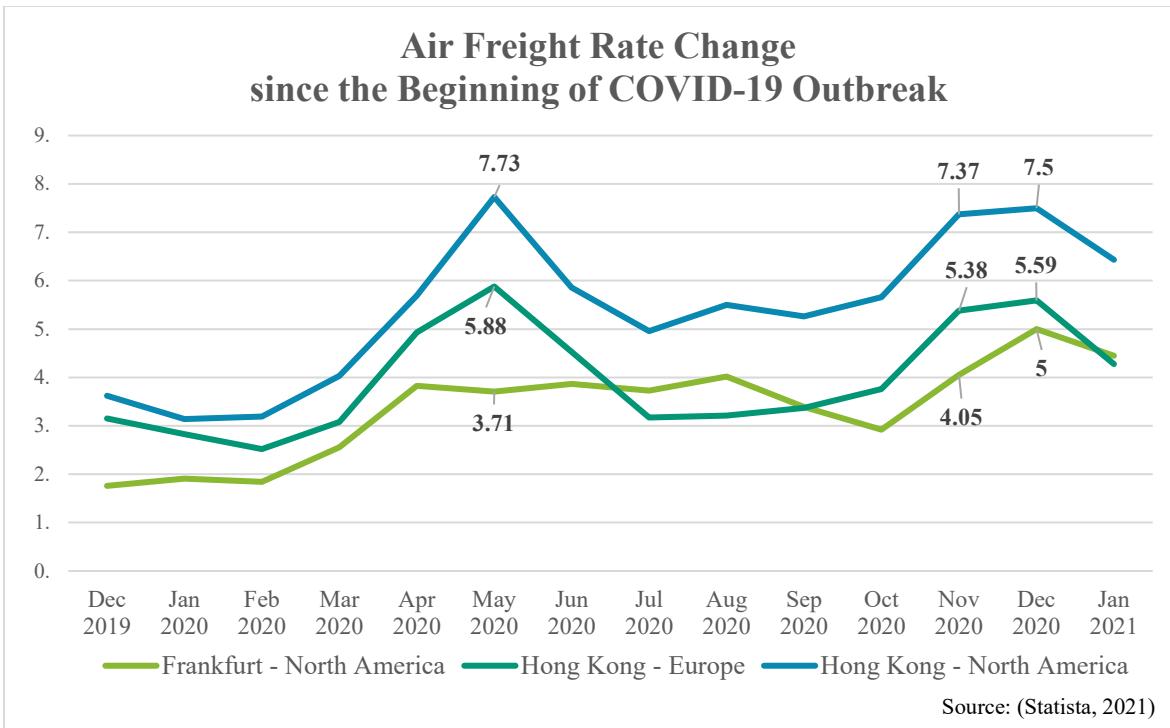


Figure 6: Air Freight Rate Change in %, Dec. 2019 – Jan. 2021

2.1.3.2 The Reaction of the Air Cargo Industry in Europe

In reference to an article (The Economist, 2021), since the airlines had to react accordingly to the travel restrictions worldwide, numerous passenger flights had to be canceled. In particular, as of April 2020, air travel decreased by 94% at its peak. As around 50% of the passenger flights were accounting for the overall cargo volume, the capacity of flights that were offered was simply too low to fulfill the transportation demand. Thus, alternatives had to be found to serve the European market with goods.

According to a report of IATA Economics (2021), airfreight has proven to be a strong player while simultaneously delivering critical supplies all over the world. As already mentioned in the previous paragraph, the heavy reduction of passenger flights caused a limitation of capacity. As a result of these constraints, a considerable number of airlines reconstructed their passenger aircraft in order to use the space for cargo-only flights, which have been referred to as “freighters”. This term has been framed by German’s Lufthansa, who were not the only ones in the European region, as stated by the writer (McWhirter, 2020) in an article.

In particular, further European airlines such as Swiss International Airlines, Austrian Airlines, KLM as well as LOT Polish Airlines, reconstructed their passenger fleets into freighters. Worth mention is the Polish Airline, LOT, which transformed a Dreamliner into a

single cargo-only flight and hence collaborated with India's GSSA Group Concorde, operating from Delhi to Warsaw, in order to transport 53.5 tonnes of pharmaceutical products and auto parts (SeaNews, 2020).

Hence, next to loading the belly hold, the passenger cabin is used for additional cargo space to fill the capacity gap (IATA Economics, 2021). Nevertheless, the report shows that the largest share of cargo is transported by freighters, who have witnessed an increase in traffic despite limitations posed by a shortage in capacity.

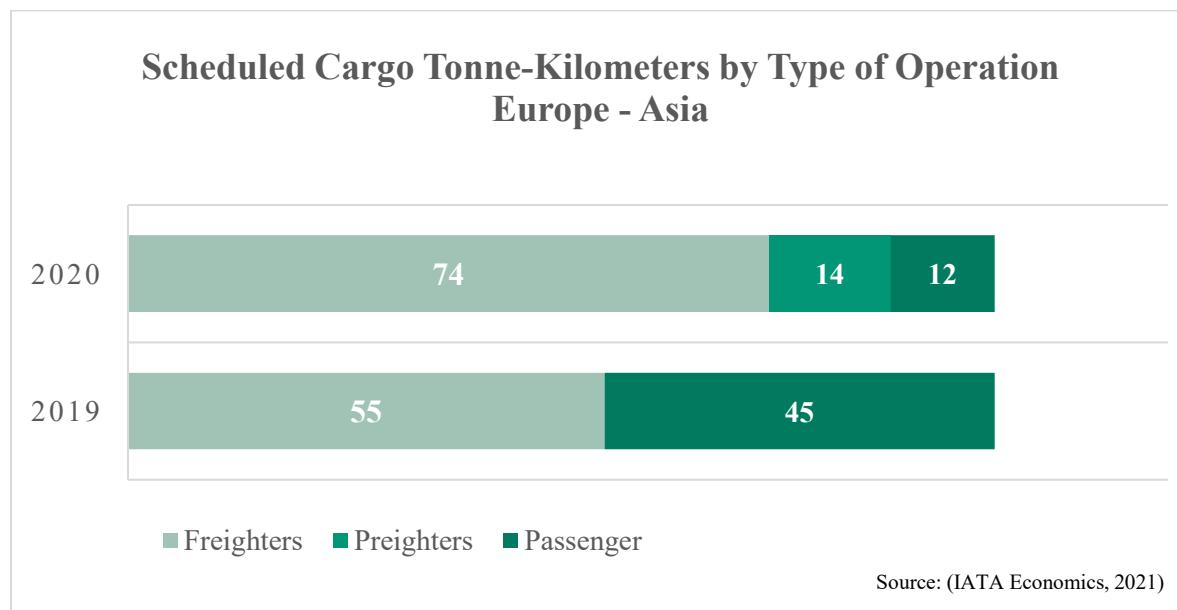


Figure 7: Scheduled Cargo Tonne-Kilometers by Type of Operation in %

The graph (Figure 7) from IATA Economics (2021) illustrates that despite freighters and passenger aircrafts having virtually an even share in 2019, there was a shift in this trend in 2020; not only did the number of freighters increase but also newly adjusted preighters gained attention, leaving the passenger flights with a small section of the whole capacity.

One example of a European Airline that modified its passenger fleets to cargo-only flights is Swiss International Airlines. As the company (Swiss World Cargo, 2020) explained, economy seats from three Boeing 777s were remodeled into cargo-only flights to meet the increasing demand for air cargo capacity. For this matter, more than 800 seats were removed at Zurich airport to ensure the consistent and regular delivery of goods. Therefore, being able to support Switzerland to optimally maintain the connection between the domestic and international market.

Nevertheless, this pandemic did not solely have adverse impacts. Opportunities to further push e-commerce were possible, which will most likely benefit all providers of cargo transportation in the future, according to Willis Towers Watson (2021). Furthermore, regarding an estimation from IBM (Perez, 2020), the pandemic might have sped up the global transformation to e-commerce by five years. This is visible in the example of the case of East Midlands Airport (EMA), which is located in the United Kingdom. While this airport is focused on air cargo, they found themselves benefiting from the pandemic, as the demand for freighters was increasing due to the lack of capacity of cargo space, which normally passenger flights would offer (Willis Towers Watson, 2021). As of the end of March 2020, the Head of Cargo at EMA reported a 10% increase in freighter movements, at its peak even 20%, where the United Kingdom, as well as other EU members, tried to jostle for medical supplies.

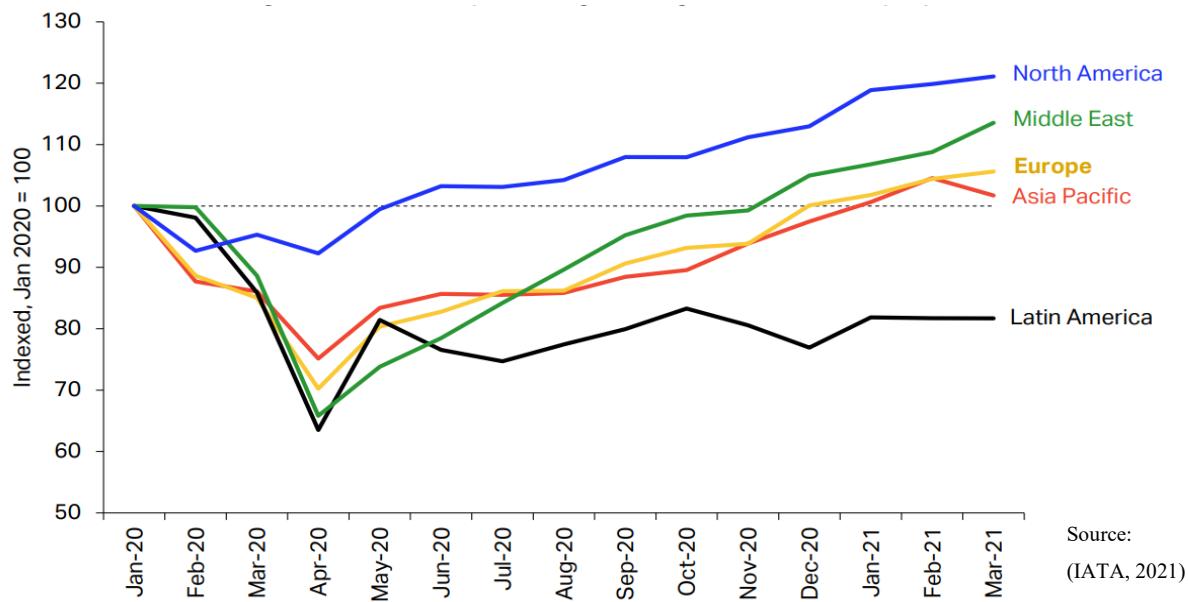


Figure 8: International Cargo Tonne kilometer flown

Published on a report from IATA (2021) in May 2021, throughout the globe the air cargo operations were able to go back to their level before the pandemic or even exceeded it in some regions. As illustrated on the graph above (Figure 8), the region of Europe is on a slow but steady route of recovery since the massive reduction in April 2020.

3 Methodology

This chapter will elaborate on the information behind this paper's methodological approach. The thesis is structured in two different ways, assuming two different approaches. While on one hand, market data has been analyzed, interviews with experts in the logistic sector have been conducted to compare the authors' conclusion to these individuals' responses and expertise based on their in-field experience. In particular, three experts were generous enough to agree to be interviewed (Appendix A-D), where meaningful and interesting aspects were collected to draw the final recommendation for this thesis.

3.1 Methodological Approach

As the authors (Creswell & Creswell, 2018, p. 41) stated in their book, there are three approaches to research: qualitative, quantitative, and mixed methods. The qualitative analyzes involve posing questions and utilizing procedures as well as data which is typically collected in the participants setting. During the process, the researcher will interpret the meaning of the data due to a prior data analysis from particulars following general themes (Creswell & Creswell, 2018, p. 50). While the final written report provides a flexible structure, its focus is set on the individual meaning and the importance of reporting is laying on the difficulty of a certain situation. As further explained in the book (Creswell & Creswell, 2018), quantitative analyzes evaluate objective theories by scrutinizing the relationship among different variables. While those variables can be determined on instruments, numbered data can be resolved by using statistical procedures. The final report in this approach differentiates from the qualitative approach where researchers have assumptions beforehand about the theory (p. 49).

The method which is used for this thesis is divided into two parts. One part will focus on the available data from reports about the European transportation market, with the spotlight on all four main transportation methods. During this process, the quantitative approach will be realized. In the second part, interviews with experts in the respective fields will be conducted to gain insight and more in-depth knowledge about the practice. Therefore, the qualitative approach will be discussed in this part and the mixed research method, which is going to be used for the paper's thesis, will be more closely evaluated in the next paragraph.

The mixed research approach has its origin in the early 1990s where the combination of different types of research was joined into one. This approach was extensively discussed in

major handbooks firstly in 2003 and again reissued in 2010 by fellow authors Tashakkori and Teddlie (2010). According to Creswell and Creswell (2018, pp. 51-52), this method associates with the accumulation of both quantitative and qualitative data. The core assumption of this approach is the integration of qualitative and quantitative data to yield additional insight which is beyond the information which either quantitative or qualitative data would provide alone.

3.2 Market Data Analysis

In a first step, the four main transportation modes, namely airfreight, sea freight, rail, and road transport are compared. The period selected for this analysis has been between 2010 and 2020. This is, on one hand, to illustrate the development of freight between 2010 until 2019, a period in which there was no Coronavirus pandemic. Furthermore, selecting the next time frame including 2020 will help point out the impact COVID-19 particularly had on freight operations.

Therefore, two graphs are presented, which firstly show the development of four transportation modes in Europe from 2010 until 2019. And secondly, which illustrates the comparison between 2019 and 2020, where the pandemic has affected the globe. The figures are extracted from the portal “Euromonitor / Passport”, which are measured in million-tonne-kilometers for all four transports modes.

3.3 Interview Structure

According to the writer Longhurst (2016, p. 103), having conversations with people is a great way to gather information. Throughout everyday life, people tend to talk either too rapidly, not listen conscientiously enough, or even interrupt others during conversations. As stated by Formplus (2020), there are different forms of qualitative interviews, such as structured, unstructured, as well as semi-structured. Structured interviews are a set of predefined questions that are presented in a standardized sequence with the objective to gather relevant information about a certain topic. Those questions are asked in identical order among different interview partners in order to simply classify the received responses. The author Patton (2002, p. 345) described unstructured interviews as an ordinary expansion of participant observation. Also, he argued that those interviews rely thoroughly on spontaneous questions in the natural flow during a conversation. The researcher comes to an interview with no predefined questions and has a

conversation with the interviewees, while generating questions in response to the interviewees' statements (Zhang & Wildemuth, 2017).

As Longhurst (2016) found, semi-structured interviews are at times referred to as informal, conversational, or even "soft" interviews. The focus within this structure is to talk to people in a self-conscious yet partially structured way. Two other authors Krueger and Casey (2000) stated that conducting semi-structured interviews do not only have the aim of talking but also:

"... about listening. It is about paying attention. It is about being open to hear what people have to say. It is about being nonjudgmental. It is about creating a comfortable environment for people to share. It is about being careful and systematic with the things people tell you" (Krueger & Casey, 2000).

For this bachelor thesis, three interviews with experts of the aviation industry were conducted, who were or still are operating in that sector. The objectives of conducting these interviews were twofold: to gain more in-depth knowledge about the expert's practical experience and understand what those experts were thinking. As some questions, which were presented to the interviewees, were based on the student's conclusion, the researcher needed to find out why those experts were having that specific opinion. Therefore, both structured and unstructured questions were asked. That being said, a semi-structured approach was conducted for the interview portion, of which the specific questions will be further elaborated on in the next section of this chapter.

3.3.1 Interview Questions

As previously mentioned in the prior paragraph, three expert interviews were conducted to obtain further understanding and background information on the subject. Two interviews were conducted by phone, where one expert received the questions beforehand on request. Another interviewee received the questions only by e-mail due to time-sensitive reasons.

However, all interview partners are listed in the following table whereas the transcription and responses via e-mail can be found in Appendix A to D.

Table 3: Interview Experts (created by the author, 2021)

Name	Position	Interview Type	Length
Marcel Hungerbühler	Board Member Bangalore Airport	Phone Call	50min
Peter Somaglia	President IG Air Cargo Switzerland	Phone Call	35min
Sven Marty	Cargo Hub Management Swiss International Airlines	E-Mail	-

As the semi-structured Interview approach was conducted, the listed questions were the fixed ones while additional questions were created during the interviews. The overall structure of the interview was divided into three parts: a brief introduction of the interviewee, questions specific to the general thesis topic, and questions particularly relating to the posed research question.

The first part covered some ice-breaker questions to get the conversation with the interview partner started. Therefore, questions about the company they work for as well as their function in that specific company were covered in the initial stage of the interviewing. Such questions asked included:

- Which company are you working for?
- Which function do you hold in your company?

The second part dove into the thesis from a general perspective. Therefore, questions were asked about how the company handled the pandemic or if they had to reorganize or adapt their business strategy in response. Furthermore, the first questions about the air cargo market in Switzerland are placed as an introduction to this topic, followed up by questioning the trend or development of the future air cargo market in general.

- Which are the biggest challenges your company had to face during the pandemic?
- Do you think that your company (in the case of Swiss World Cargo employee) adapted well to this situation?

- How do you think, was the Swiss Air Cargo Market influenced by the impact of the Pandemic?
- What kind of trend or development do you see for the Air Cargo Market in general for the future?
 - Volume, Capacity?
 - In Switzerland? In Europe?
 - On a global level?

Finally, the last part of the interview covered questions to answer the research question. After shortly introducing the hypothesis, these posed questions aimed to collect the different perspectives and opinions of the selected interviewees.

- Many airlines had to reduce their routes and consequently, a decreasing number of passenger flights were operating which originally transported the freight. Especially within the European Market. The hypothesis in this thesis consists of the claim respectively the question, if a shift was distinguishable from the air cargo to the road freight (Truck) sector in Europe, which is a highly used transport mode in this region.
 - Do you agree with this statement?
 - Yes / No → Why? What is your opinion about this topic?
 - Which alternatives do you see in the short or long-term perspective for this issue, if the airlines cannot return to their original fluctuations and offer about the same amount of capacity as before?

3.3.2 Analysis of Interviews

After the interviews have been transcribed (Appendix A-D), they have been coded (Appendix E) in different ways in order to develop a detailed analysis of the findings. As the author Gibbs (2007, p. 38) stated: “Coding is how you define what the data you are analyzing are about”. In particular, it contains the identification and record of one or more paragraphs of text or other information, which in some sense represent the same theoretical or explanatory idea. Generally, different paragraphs are identified, which are linked to a tag for that specific idea – the code. Hence the book explains, that all the text that is concerned about the same thing or demonstrates the same thing is coded with the same tag (Gibbs, 2007, p. 38).

4 Findings

The following chapter consists of the findings, which are divided into two separate sections. Firstly, the market data has been analyzed and illustrated in different graphs to present the development of the various transportation modes as well as the impact of COVID-19. Furthermore, three interviews have been conducted with various experts from the aviation industry. Those interviews have been coded (Appendix E) and thoroughly analyzed. The analysis will be presented in the following section.

4.1 Analysis of Market Data

Taken from the portal Euromonitor (2021), the figures for the main four transportation modes (air, sea, road, and rail) are displayed in the following graph (Figure 9).

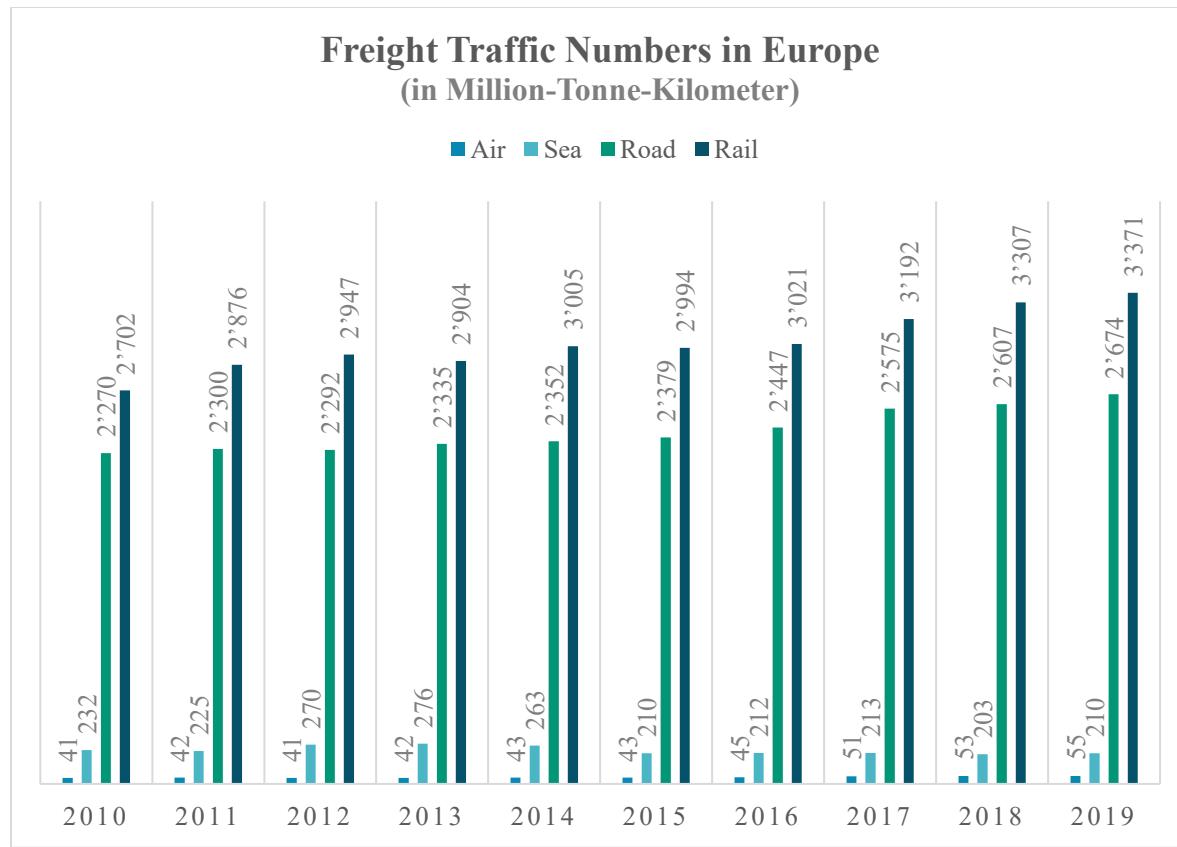


Figure 9: Freight Traffic Numbers in Europe, 2010 – 2019 (Euromonitor, 2021)

As already mentioned in the theoretical framework section, in Europe, the main transportation mode used is land transport. This includes both rails as well as road transportation modes. On the table above, this prominent status is visible in the high amount of volume, which is carried by road and rail, respectively, every year. This is likely due to Europe having a very

well-established network in terms of surface connectivity and the reachability by truck or by rail, from one country to another. Therefore, these numbers have been on a steady increase between 2010 and 2019.

However, it is a different story with sea transportation. According to the above-mentioned graph, the figures are fluctuating constantly in the region of Europe from 2010 until 2019. While 2013 was a peak year for maritime transportation within the region, it did reach one of its lowest levels around 2019. Moreover, air cargo has been constant from the year 2010 until 2016 where it moved up decently until the end of the year 2019. As most of the air cargo is carried on passenger flights in Europe, the steady increase can be explained through the constant growth of passenger fleets (Eurocontrol, 2019).

By looking at the graph below (Figure 10), the years 2019 and 2020 have been put into comparison, in order to reach a direct contrast between the last “normal” year, without the impact of the pandemic.

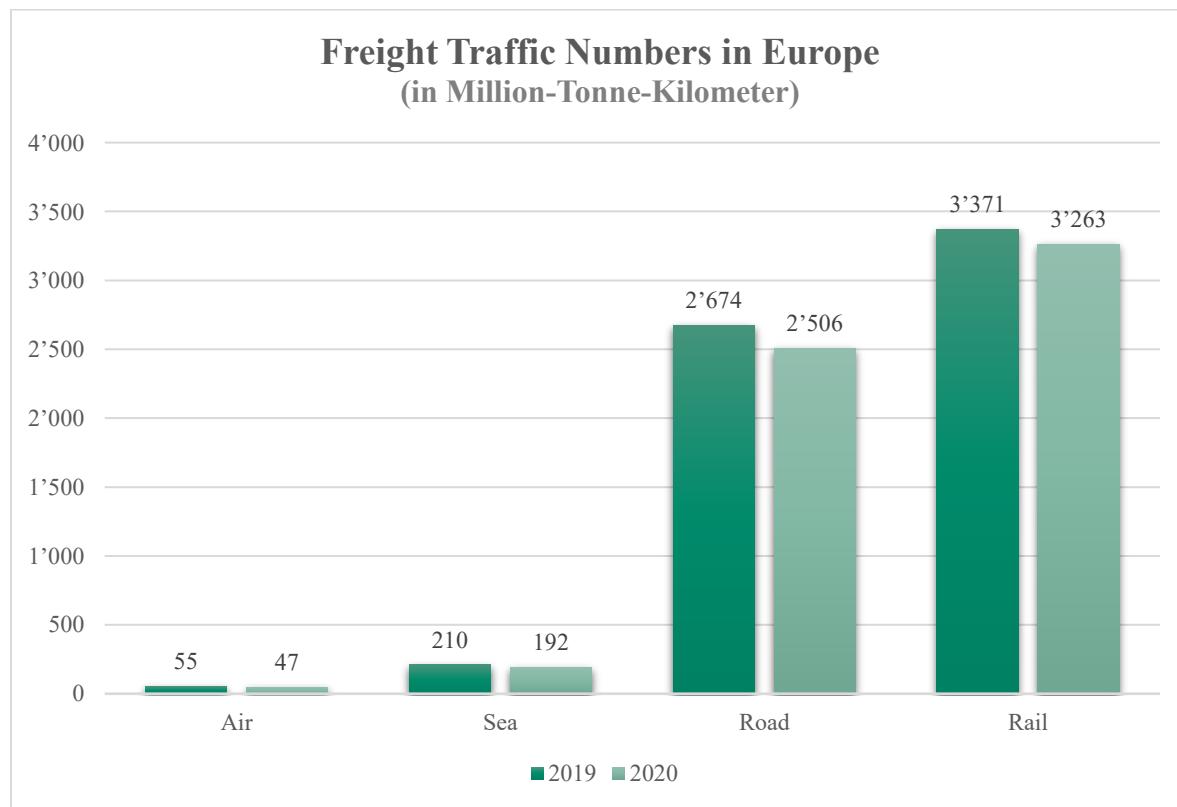


Figure 10: Freight Traffic Numbers in Europe, 2019 – 2020 (Euromonitor, 2021)

What is visible at first glance is the decrease in volume in all four transportation modes in Europe. Due to the border restrictions, which the various governments in Europe have

declared during the first lockdowns, trucks occasionally had a difficult time crossing due to the government's implementation of curfews, which subsequently created long queues and waiting times. Furthermore, the growth in global trade was subdued due to the underperformance in the manufacturing-intensive economies (IATA, 2020).

4.2 Evaluation of Expert Interviews

The following coding approach has been conducted in order to evaluate the content of the interviews (Appendix A-D) thoroughly. As a first step, three main themes have been selected, followed up by different subthemes as presented in the table (Table 4) below.

Table 4: Coding Themes (created by the author, 2021)

Themes	Subthemes
Impact of COVID-19	<ul style="list-style-type: none">• Shortage of Capacity• Price / Rates• Shift of Commodities• Rethinking• Fine Distribution• Procurement from different Countries• Tonnage transported• Maintenance of Planes
Alternatives in Transportation	<ul style="list-style-type: none">• Road Feeder Services• Different Transportation Modes in the Future
Sustainability	<ul style="list-style-type: none">• Environmental Issues

The first theme related back to the first research question defining what kind of different impacts the coronavirus had on the air cargo transportation sector. For this reason, the interviews have been coded into the above-presented subthemes in order to reach a conclusion.

The second theme was about the second research question, focusing on the alternatives of transportation modes as a result of the shortage of capacity (posed in the first question) as well as whether the interviewees had their ideas about what alternatives could be used in the

future transportation to particularly serve as intercontinental connections and relieve the air cargo sector.

Lastly, it is in the interest of everyone to be optimistic and figure out a potential outcome of the time after the pandemic, namely the time of recovery from COVID-19. In this theme, different subthemes about sustainability as well as its impact or future trends about the traveling behavior have been summarized, as the passenger flights have a direct impact on the air cargo operations in Europe.

4.2.1 Theme I – Impact of COVID-19

The questions which were asked for this theme were about the consequences of the pandemic on the aviation industry as well as the air cargo sector.

4.2.1.1 Shortage of Capacity

The interviews demonstrated that, due to the elimination of passenger flights, capacity was drastically lessened. According to Somaglia (2021), a distinct amount of the capacity disappeared suddenly. 50% of air freight had to be transported on passenger flights, whereas the other half by freighters. However, the affected airlines were able to mitigate the impact by increasing the number of freighters. With the support of road feeder services, smaller airports were able to reroute their freight to bigger hubs, in order to fill those freighters. Nevertheless, the interviewee (2021) further mentioned, that according to his opinion, the total global air capacity has decreased by about 25%, and other transportation modes, such as rail or seaways, saw an increase in usage.

Marty (2021), who is currently operating in the Swiss World Cargo department, mentioned that as a result of the occurred travel restrictions, lockdowns, quarantine lists, and closure of airports, Swiss International Airlines had to face an almost complete stop of their operations. The reduced number of flights went from 250 daily flights to between three and five flights per day.

Moreover, another reason might be the decrease in global industrial production, which created a new trend that saw a decrease in demand for airfreight capacity. A specific example, such as Bangalore Airport in India was mentioned by Hungerbühler (2021), where practically the whole loss of passenger aircraft has been replaced with cargo airplanes, provided by airlines

such as Emirates, Qatar, or Singapore Airlines. This example shows that the whole world, not only Europe, was affected by these issues.

4.2.1.2 Price / Rates

According to one of the interviews (Somaglia, 2021), the reduction of operating passenger flights did not only have an impact on the reduction of capacity but also on the price/rate being offered by the airlines. As the rates were increasing dramatically in the beginning, they started to balance out because of the higher amount of capacity being continuously provided by the integrators. For instance, as the interviewee (Marty, 2021) mentioned as an example, the flight rates for a cargo shipment running between China and Europe increased sixfold because of the available capacity. In addition, Marty (2021) highlighted that the export market from Switzerland started to increase steadily every week in April and May 2020. However, the prices per kilo raised massively as well.

Furthermore, the interview (Somaglia, 2021) revealed, that companies are naturally trying to be as cost-efficient as possible, even if that means having to select another airline at a cheaper price. This natural behavior simultaneously impacts carrier loyalty, which is stated as very low among the airline industry according to the interview expert. However, even though a certain level of moral obligation or responsibility between the carrier as well as their customers exist, expenses especially during this crisis need to be kept as low a level as possible.

Moreover, according to the second interview expert (Hungerbühler, 2021), being kind of forced to use the costly air cargo transportation can be very frustrating for firms if they are dependent on the fast-delivery service as well as reliability, which virtually only carriage by air can provide. Thus, companies had to pay those high rates which occurred due to the capacity shortage after the outbreak of the pandemic. Additionally, as Somaglia (2021) highlighted during the interview, he stated that about 30% of the global value chain are transported by air, mostly due to their dependency on the type of the product and degree of time pressure.

4.2.1.3 Shift of Commodities

This crisis indeed brought about a shift, particularly affecting the commodities which were transported since the start of this pandemic, as mentioned by Hungerbühler (2021). As an interviewee particularly stated, items such as medical supplies, protective masks, and all other necessary items which are needed in a hospital were high in demand at the onset of the crisis. An important aspect to consider was also that those deliveries had to operate in a fast manner,

as affected countries were urgently in need of those medical supplies, leaving air freight as the only opportunity again for transportation. However, there was an increase from the import side as well, where sanitary articles from China were delivered to Switzerland in high amounts, according to an interviewee (Marty, 2021).

4.2.1.4 Rethinking

Crises are challenging people in the sense that they need to be flexible and adapt to new circumstances. In this case, the pandemic did not only impact the lives of individuals but also business operations. As it is now unavoidable to test for any corona infection before a trip, travelers will think twice about the effort they have to undergo. This can be read in the interview with Marcel Hungerbühler (2021) as he states that, according to his opinion, there will be a general rethinking in terms of traveling, which would affect the passenger flight operations and therefore European air cargo operations. However, as Somaglia (2021) praised, Swiss International Airlines responded very positively to the capacity issue, as they converted three of their B777 fleets into “freighters”. This is a process where Economy seats of the main cabin are removed in order to have more loading capacity for cargo on the main deck. The interviewee also mentioned other European Airlines, such as eventually Air France and KLM, that followed suit.

After all, Marty (2021) critically scrutinized this procedure in that sense, as other airlines such as Air Canada already operated their first remodeled aircraft by mid-March, whereas Swiss International Airlines needed a little bit longer until the start of April. The previously mentioned Dutch airline KLM started even later in May. Nevertheless, the reaction in general for a non-cargo airline like Swiss International Airlines is neither good nor bad in comparison to other operating airlines.

Another example is Turkish Airlines, which started to expand its offers and operate more frequently with its freighters at Zurich Airport in Switzerland. As Somaglia (2021) claimed, Zurich Airport has higher handling costs than Basel Airport, for example, which makes it unattractive for some airlines to collaborate. In addition, Zurich Airport is not a freighter airport and is thus more focused on passenger flights, giving carriers fewer opportunities to react in that sense.

The interviewee (Hungerbühler, 2021) also mentioned another advantage with the movements of these freighters in connection with the company's pilots. In order to maintain their pilot license, the pilots have to operate a specific number of take-offs as well as landings. Hence, Hungerbühler (2021) thought that it was indeed a good move from the airline to efficiently use their passenger flights to generate more capacity as well as keep their pilots operating in order to maintain their license.

However, an important danger which the interviewee (Somaglia, 2021) mentioned was the following. Many happenings occurred since the outbreak of the pandemic in Europe back in March 2020. The numbers of freighters, as well as road feeder services, have increased, operating mainly over the European Hubs. Somaglia (2021) pointed out that customers will get used to the new opportunities they have for the transport of their goods, and that changing their behavior will therefore be difficult. Thus, smaller airports such as Zurich Airport (with its home-based airline Swiss International Airlines) will have trouble bringing those volumes back when direct flights become possible again. This reduction of dependency on air freight operations may also translate to a reduction of profit for the air freight transportation industry.

4.2.1.5 Fine Distribution

Land transport is one of the most preferred transportation modes available in the European region which includes rail and road operations. This is because the fine distribution is working cohesively throughout this kind of transportation mode, according to the interviewee (Hungerbühler, 2021). Air cargo is suitable for transports having to cross different continents or distanced countries in a short amount of time. However, when the goods need to be delivered to their destination from the airports, the customer must rely once again on trucking systems. Hungerbühler (2021) also stated that the same issue is visible with rail transportation, which can transport the goods from one station to the other, but not directly to the final customer.

4.2.1.6 Procurement from Different Countries

In addition, an intact global supply chain is crucial now, as the world is depending on the delivery of vaccines and medical supplies in particular. In order to do so, ingredients for the vaccines need to be transported beforehand of the production. Hence, these are mostly not available or sourceable in the producing country but must be delivered from different other countries as well, as Hungerbühler (2021) concluded in the interview.

4.2.1.7 Tonnage transported

Furthermore, Hungerbühler (2021) mentioned a comparison of tonnage between 2019 and 2020 at Zurich Airport in Switzerland. While in 2019 the airport was handling an amount of nearly 452,000 tons of cargo, the total tonnage decreased by 35% in 2020 and hence amounted to around 291,000 tons. As already stated before, these had to do with the elimination of the capacity of passenger aircraft.

Additionally, Marty (2021) highlighted another aspect where he put the volume into comparison with the capacity. As a result of the cancelation of the Antonov aircraft as well as the unreliable vessel operations, more heavy shipments switched to air freight transportation. Consequently, these circumstances not only caused higher fuel costs but also raised the volume-based capacity on flights.

4.2.1.8 Maintenance of Aircrafts

Moreover, connecting to the previous point made, due to the travel restrictions and numerous amounts of flight cancellations, passenger flights were grounded. As mentioned by the interviewee (Hungerbühler, 2021), those aircrafts positioned at the airport on the stand were required to be technically overhauled as well, even without movements. Hungerbühler (2021) mentioned an example of Swiss International Airlines, which moved about 14 fleets to Amman in Jordan due to the climate there being very dry.

4.2.1.9 Different Meeting Approaches

Additionally, due to the shortage of capacity, Hungerbühler (2021) mentioned that meetings had to be adapted to a digital environment. Therefore, all business meetings were held online as a result of the reduction of passenger flights and travel restrictions. However, he highlighted that, on one hand, he sees a trend that this method will probably stay as those video conferences are normally running without any problems. On the other hand, he still thinks that it is sometimes essential, as a leading manager, to visit the branches abroad to connect with the employees and gauge the situation in person. He states that it is difficult to correctly visualize the situation on-site if there is no personal meeting happening. Therefore, he concludes that he sees a trend of a reduction of business travelers for meetings which are also possible to be held online.

4.2.2 Theme II – Alternatives in Transportation

In this section, the interviewees received questions about the future, how they believe the air cargo sector will develop given the pandemic's impact, and what kind of alternatives they see for the air cargo industry.

4.2.2.1 Road Feeder Services (RFS)

As the interview furthermore determined, road feeder services proved themselves as an increasing business during the pandemic. Due to the increase of freighters, two of the interview experts (Hungerbühler, 2021; Somaglia, 2021) stated, that road feeder services are gaining on importance. This as a result of the reduction of passenger flights at smaller airports, where air cargo shipments had to be carried by trucks to bigger European hubs operated by the RFS.

However, according to Marty (2021), the market share of freight that is transported in Europe from point to point is quite low. This percentage share only amounts to 20%, whereas the remaining 80% of flights in Europe were coming from third countries, which makes it impossible to be transported by RFS. Nevertheless, this 20% was eventually transported by trucks. Additionally, those customers who depended on fast delivery did not accept RFS as an alternative and therefore still preferred a flight connection for the carriage.

Two interview partners (Hungerbühler, 2021; Somaglia, 2021) have also been questioned about alternative transportation modes and whether they see an upcoming trend for the future of air cargo operations. They shared a mutual opinion that the rail connection, namely the old silk road, which connects Europe with China is a cost-efficient alternative to intercontinental operations. This rail connection lays in the middle between other transportation modes and offers a good alternative for those goods, which are not too time-sensitive. According to Somaglia, (2021) this infrastructure is becoming a huge competition for the air freight industry, as the trains are transferring through Russia and Kazakhstan as well on the way from Germany to China, in a reasonable amount of time.

4.2.2.2 Different Transportation Modes - Trends for the Future

However, Hungerbühler (2021) states that it is important for the European transportation sector to further expand its existing rail network to relieve the massive amounts of trucks on the streets. Furthermore, the interviewee Hungerbühler (2021) highlighted a new way of transportation, which was subject to discussion as a potential vision for Switzerland in the

future: a construction of an underground metro, which operates with tube systems, while pushing the running trains back and forth. He also states that those are long-term strategies, which would cause very high costs. Nevertheless, he also concludes that he does not think the transportation behavior in Europe would change that much and that Europe must set its focus on transporting its goods by rail.

On the contrary, Marty (2021) had a different opinion. He did not mention any other alternatives in terms of other transportation modes. Moreover, the interviewee claimed that it would make more sense to convert more passenger aircraft into freighters, to avoid the risk that freighter-only airlines, such as DHL, FedEx, UPS, etc., could position themselves as a monopoly in the market. In particular, the interview partner (Marty, 2021) stated that he does not think the level pre-pandemic will return before the year 2024. Therefore, the focus should be on converting as many aircraft as possible into freighters to optimize efficiency. Nevertheless, in terms of volume and capacity, levels will return to their original level (as before COVID) by the end of 2021 in Europe. In particular, the interview partner also stated that he does not think that the level of passenger demand will reach the pre-COVID level until the year 2024.

4.2.3 Theme III – Sustainability

The last theme relates to the previously mentioned one, concerning future scenarios and trends. However, this theme focuses mainly on the sustainability and environmental part of the aviation industry.

4.2.3.1 Environmental Issues

As already mentioned in the previous paragraph, Hungerbühler (2021) mentioned that the massive amounts of trucks and vehicles on the street is a concerning topic. He also elaborated that there are no endless resources available to further build infrastructures; this would only result in further congestion of highways and streets. Regarding the aviation industry, Somaglia (2021) stated that the mentioned sector contributes a little bit less than 3% of the global CO₂ emission, stating that air cargo takes up to 0.7%. However, he stated that this level, in general, is not much; only when the rates are calculated with a factor of 100 or 200 times more than sea or rail transportation, the differences are immense. The interviewee described the disparity according to the huge amount of volume which vessels can transport at once, while only one engine is running. Therefore, sea freight vessels can keep their CO₂ emissions relatively low in comparison to the aviation industry.

5 Discussion of Findings

The pandemic has restricted the daily life of everyone around the globe since the start of the crisis back in January 2020. However, the industry which had to experience a huge loss was indeed the aviation industry. With the traveling restrictions, quarantine, lockdowns, and consequently the closure of various borders, it was impossible to maintain the level of passenger flights at a pre-Covid level. Despite those circumstances, there was one sector in the air transportation industry that was efficiently supporting the global value chain by offering various options to continue carrying important goods to countries and places in need. The following subchapters will compare the theory with the findings in accordance with the previously given research questions.

5.1 Distinguishable Shift from Air Cargo to Road Transportation in Europe

After analyzing the market data in the previous chapter, it is difficult to see if the amount which decreased in the air cargo has shifted completely to the road transportation industry. In general, according to the graphs, all four transportation modes had to experience a decrease in their volume as an aftermath of the shortage of capacity. Therefore, the shift did not necessarily happen from air cargo to road transportation in a direct sense. But rather two transformations in this context were observable. The first was a shift from the transport of air cargo on passenger flights to the heavy increase of full-freighter flights, the second was a surge in demand for road feeder services.

Subsequently, according to the feedback from the various interview partners, those shifts happened for the following reasons: the urge to deliver medical supplies as fast as possible to destinations in need and an increase in e-commerce (given individuals had to order their goods from online stores due to lockdowns). Those products most likely had to be delivered as fast as possible, therefore air freight transportation was the only option. Nevertheless, the increasing demand for air cargo transportation on one side, whereas the reduction of supply in capacity on passenger aircraft to carry out those transports on the other side, caused severe difficulties.

In Europe, different airlines such as Swiss International Airlines or KLM reacted very well under those circumstances and remodeled some of their passenger fleets to freighters. Those reconstructions had several benefits to offer from various perspectives. Firstly, the airlines were able to carry additional goods in the main deck and therefore help meet the growing

demand. Secondly, more capacity was available for the forwarders to book their spaces on the aircraft. Thirdly, airlines were able to at least operate a part of their fleets. And finally, the pilots still had the opportunity to fly distances, which were required to extend their pilot licenses.

However, during the current crisis, it was difficult for smaller airports to withstand the ability to transport their goods by air cargo, as the supply was rarely available. Road feeder services served as a solution for this problem which delivered goods from smaller European airports to bigger hubs to fill those full freighters. This amount of flexibility as well as its ability to adapt to new situations was necessary to maintain the global supply chain.

The meaning of the results is very essential for the global supply chain, as the goods had to be transported despite the restrictions. One can say that even though the aviation industry found itself in very difficult situations, they were flexible enough to change their business operations. Furthermore, the airlines were steadily trying to use alternatives to maintain their delivery chain. The increase in freighters is evident of an innovative alternative and demonstrates the flexibility to adapt rapidly to the given circumstances.

Furthermore, after extensive research, Euromonitor was chosen as a reliable source to analyze the market data. This source offered the ability to provide figures from all four transportation modes in equal units as well as from the same period (2010 – 2020). Thus, the results might not be significant enough and need further analysis. Other platforms such as the European Commission, which owns a huge database about many topics and statistics in Europe, have not published the complete figures of the year 2020 so far. Therefore, it was challenging to find relevant data and, thus, more difficult to compare between different platforms.

5.2 Alternatives of Transportation Modes after Recovery of COVID-19

As this pandemic is a fairly recent and contemporary topic, there are very few reliable research papers available that cover the same topic so far. However, as this crisis still has no end in sight, it is dependent on the future. Other transportation methods besides air cargo are possible to transport goods on an international level and will gain popularity from time to time. As mentioned in the findings part, two of the interview partners predicted that the customers might change to the train connection, which recently started to serve between Europe and China. Certainly, while this option is the cost-friendliest, the transit time is longer than air freight. However, it would still be faster than sea freight.

In theory, this might be the perfect alternative and option to carry goods from Europe to other parts of the world on rail. Nevertheless, the massive volumes which would need to be transported on the rail network would also require further development of its current infrastructures and expansion of its geographical network. Moreover, it will probably not be possible to remove all trucks from the streets, as the fine distribution from the place of origin as well to the destination needs to be ensured as well. However, one can likely conclude that trucks will remain an important part of contemporary transportation. Nonetheless, an important aspect to consider is the environmental issues as well. With so many vehicles on the streets and the ongoing process of building new highways and infrastructure for road transportation, the limit will be reached at some point where it is impossible to offer the necessary resources in this matter.

Moreover, not all the interview partners had the same opinion about the transportation mode for the future after the world has recovered from COVID-19. As some are suggesting a switch to another transportation mode, one interviewee suggests further expanding the remodeling of freighters. This is because other forwarding carriers, who are operating full freighters, could position themselves as a monopoly in the market. Both suggestions seem to be very reasonable. While a switch to other transportation modes can have a sustainable and environmental impact, another advantage might be the prevention of unnecessary spending and freight expenses for a company.

Furthermore, as it is imaginable that the demand for passenger flights could decrease as a result of a general rethinking about traveling, the possibility might occur that the necessary capacity for air cargo is shortened as well in Europe. A notable aspect in this sense has been mentioned by one expert, where he stated that customers are a creature of habits. This fact might put obstacles into the full recovery of air cargo operations, as the clients had to adapt to newly created circumstances. With that said, they got used to either the RFS with the full-freighter service or even switched to rail transportation respectively sea freight operations. However, according to figure 8 (chapter 2.1.3.2), the air cargo market in Europe has recovered pretty much to the same level as before the crisis started. Therefore, the air cargo market is finding itself actually on an optimistic way back to full recovery.

To conclude, the fact that the amount of freighters has increased tremendously, made it possible for airlines to transport higher volumes at once rather than smaller volumes on single

passenger flights. Furthermore, with the introduction of freighters, the carriers were able to also include passenger flights into their available capacity which might explain the fast recovery of the total volume of air cargo not only in Europe but also in other regions such as the Middle East as well as North America.

6 Conclusion

This pandemic still represents difficulties for the people to freely move around due to several restrictions as well as the reduction of capacity from the airlines. However, it is important to understand how essential the aviation industry is for the delivery of critical goods and products due to its rapid delivery speed. Without the flexibility and adaptability which the airline industry was able to offer from the beginning of the crisis until now, it would have been difficult to maintain a running global supply chain. This chapter concludes this thesis and highlights the main points in the first subchapter. It furthermore highlights any limitations as well as presents recommendations for future purposes.

6.1 Main Conclusion

Air cargo transportations have been in high demand since the start of this crisis as it was necessary to carry critically needed medical supplies and pharmaceuticals as well as consumer goods around the globe. However, in general, air cargo transportation is divided more or less equally into two forms of aircraft: passenger aircraft and freighters. In the case of Europe, when the supply of passenger flights started to shrink, less capacity was subsequently available for air cargo transportation. As Europe is very well connected on the surface, companies conducted a logical rethinking and shifted to methods that contained an upbringing of larger volumes on a less frequent level. First, they used the opportunity of the European network to transport their goods from smaller airports to bigger European hubs with the support of road feeder services to further load their goods on full freighters. Therefore, no direct shift happened from air to road, but rather an indirect one from passenger flights to freighters via road feeder services. In addition, some European airlines removed economy seats off their main cabins to use their passenger fleets as a full freighter as well.

It can be assumed that this crisis will continue for a little longer. Even though different governments take actions in terms of their measurements against this pandemic, there is a rather small improvement but no end in sight. Moreover, a behavioral change is visible where individuals started to adapt and adjust their travel behavior given newly imposed travel restrictions and pre-travel requirements. This adaption could have long-term impacts on the travel behavior and therefore affect the demand in traveling, which is connected to the capacity available for air cargo space on passenger flights.

Therefore, it is crucial to think about alternatives that make it possible for goods to be transported, when the necessary capacity is not available. Those are found in the maritime as well as road transportation modes. They are proven to be more environmental, as well as cost-friendlier than air cargo transportation. The only downside of those transportation modes is the longer transit times in comparison to air cargo. However, as the silk road with the existing rail connection between Duisburg (Germany) and Xi'an (China) is already operating, it is essentially a question of time until more and more goods will be considered for this method intercontinentally. Nevertheless, one should not forget the ongoing project from China in terms of the Belt and Road Initiative, which aims to connect Asia with Africa and Europe on land and sea ways, portraying a close competition for the air cargo industry.

6.2 Limitations

It was challenging to find sources where the traffic numbers were both constant and reliable. Furthermore, as this pandemic is a recent issue, many platforms did not publish the figures of 2020 with complete numbers so far, thus limited a further comparison between different sources. Moreover, because the scope of the thesis is narrowed down to the market, it was not considered to further investigate more detailed about specific product groups. In addition, as the scope of this paper involved the research about the air cargo industry, this paper, therefore, was not able to differentiate between, for example, freight forwarders, airlines, or integrators.

6.3 Recommendations

It is recommended to further expand the research by waiting for the respective platforms, which carry the responsibility for each transportation sector (air, sea, rail, road) to publish the numbers of 2020 and further 2021, in order to draw a more thorough and comparable analysis. As the world has taken measurements to adapt to the current situations, the market was able to, for the most part, recover from the crisis in the short term. However, there are still long-term damages that need to be restored. Hence, research should be taken constantly to reflect on the past in order to realistically forecast the future. Furthermore, while this pandemic is still a continual process and this thesis researched the data until December 2020, further research should be conducted consistently to find out if there might not be more opportunities for the air cargo industry in Europe in order to develop and improve its services.

Moreover, as this thesis analyzed the European region, it is recommended to expand the research on a worldwide level to see how other areas were impacted by this crisis and in which way their response to this pandemic was or what their plan will be in the future. In addition, this paper scratched the surface of this topic by analyzing solely the European market, with a closer focus on air cargo operations. However, it did not consider other involved parties, such as freight forwarders, airlines, or integrators as a single unit, which is suggested to conduct further analysis. Additionally, as mentioned in the findings section, there was a high demand for medical supplies and pharmaceuticals. Therefore, it is endorsed to further study about the change of demand in the specific product groups.

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8 Appendix

Appendix A: Transcript Interview A

Interviewer:	<i>Trieu Tu Khanh Jacqueline</i>
Interview Expert:	Hungerbühler Marcel
	Member of the Board – Bangalore International Airport Ltd.
Date:	April 16 th , 2021
Location:	Telephone
Interview Language:	Swiss German (Transcribed in German)

Confidentiality Agreement

Do you agree to have the interview recorded for transcription?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
Do you consent that the information provided in the interview can be used for this Bachelor's Thesis?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>

Hungerbühler Marcel: Zu Ihrer Information, ich bin nicht wirklich ein Frachtspezialist, vor allem nicht was den Europäischen Markt betrifft. Von 2007 bis 2016 hatte ich die Chance, in Indien zu arbeiten, zuerst 4 ½ Jahre in Bangalore als COO und CEO des neuen Greenfield Flughafens und danach 5 Jahre in New Delhi, wo ich am Flughafen die Operation geleitet habe. Meine Frau und ich verbrachten beinahe zehn Jahre in Indien, es war eine schöne Zeit. Seit 2017 bin ich im Verwaltungsrat vom Flughafen Bangalore. Das heisst, ich gehe noch vier Mal pro Jahr zurück nach Indien an die Verwaltungsrat Sitzungen. Natürlich leidet die Aviatik Branche in Indien sehr unter der Coronakrise, bis jetzt noch nicht so dramatisch wie in Europa. Aber trotzdem ist es natürlich sehr, sehr schwierig im Moment.

Interviewer: Ja, also ich habe in den Nachrichten nur so zufällig gehört, dass Indien jetzt auch eine sehr hohe Ansteckungsrate gehabt hat in der letzten Zeit. Ehm ich glaube es sind ungefähr bei 100,000 gewesen pro Tag.

Hungerbühler Marcel: Das ist richtig. Am schlimmsten ist es in den Staaten Maharashtra (Bombay), West-Bengal (Kalkutta), Kerala und Punjab. Während der ganzen Zeit hat es immer wieder Gebiete mit hohen Infektionszahlen gegeben, so auch in der Hauptstadt New Delhi. Wobei Indien vergleichsweise zur Bevölkerung relativ wenig Todesfälle hatte. Man muss allerdings berücksichtigen, dass es eine grosse Dunkelziffer gibt.

Interviewer: Ja, ich denke so die Leute die sehr auf dem Land draussen wohnen, haben gar keine Ressourcen um das Testen oder so, nehme ich mal an.

Hungerbühler Marcel: Das ist richtig. Ja, und am schlimmsten ist die Situation natürlich in den riesigen Armenvierteln in den Grossstädten, also vor allem Bombay aber auch Delhi oder Kalkutta und anderen Grossstädte. Die Leute leben auf engstem Raum, es ist praktisch unmöglich, Ansteckungen zu vermeiden. In Bangalore ist der internationaler Verkehr Mitte März 2020 praktisch zum Stillstand gekommen, weil praktisch alle ankommenden Passagiere in Quarantäne mussten. Aber, im Inlandverkehr sind wir seit November zurück bei knapp 60% des Passagierverkehrs, bei ca. 65,000 Passagiere pro Tag. Es scheint aber eine neue Welle aufzukommen, in den letzten Tagen ging das Passagieraufkommen auf 49,000 pro Tag zurück, vor allem die Bombay Zahlen gingen stark zurück. Aber, das ist immer noch relativ hoch im Vergleich zum Verkehrsaufkommen in Zürich. Und was noch interessant ist, bei der Fracht sind wir mehr oder weniger auf dem vor Corona Niveau.

Interviewer: Ach wirklich?

Hungerbühler Marcel: Ja. Was in der Fracht passiert ist: Die Frachtkapazitäten der internationalen Passagierflüge fielen im März 2020 von einem Tag auf den anderen weg, da die Flüge gestrichen wurden. Bei einem Langstreckenflug sind das 20 bis 25 Tonnen pro Flug. Das ist sofort weggefallen, weil die Flieger nicht mehr operierten. Aber in der Zwischenzeit wurde diese fehlende Kapazität durch Frachtflugzeuge ersetzt.

Interviewer: Also durch komplette Frachter?

Hungerbühler Marcel: Genau. Die Fluggesellschaften mit Frachtfliegern haben schnell reagiert, allen voran Qatar Airways. Aber auch Emirates, natürlich FedEx und DHL, und auch Lufthansa und Singapur Airlines. Diese haben praktisch die ganze Kapazität mit Fracht-Flugzeugen abdeckt.

Interviewer: Ja, spannend. Was sind denn die verschiedenen Produkte also Güter wo jetzt von Indien weg gehen?

Hungerbühler Marcel: Perishables (Früchte und Gemüse, im Moment Mangos), Pharmazeutische Produkte, Medizinische Geräte und Kleider.

Interviewer: Oder sind das die Menge wo Sie sagen, dass es sogar mehr ist wie vorher, sind das Import nach Indien?

Hungerbühler Marcel: Ich müsste mal die Statistik aufmachen, wie viel das von beidem ist. Beim Import handelt es sich vor allem um Elektronische Geräte für die IT Industrie, Spezialmaschinen aus Asien, Europa oder Amerika. Spezialmaschinen die für die Produktion in der Textil- Autoindustrie und den IT-Firmen gebraucht werden, also hochwertige Maschinen und Ersatzteile, die nicht auf dem Seeweg transportiert werden... Aus Indien raus, wie gesagt, Pharmazeutische Produkte, Biotherapeutika ist ein grosser Markt.

Interviewer: Von Indien raus?

Hungerbühler Marcel: Jawohl.

Ja.*Interviewer: Spannend*

Hungerbühler Marcel: Die pharmazeutische Produktion Indiens ist riesig. Und wie erwähnt Lebensmittel, also landwirtschaftliche Produkte. Lassen Sie mich kurz nachschauen.

Interviewer: Natürlich

Hungerbühler Marcel: Auf der Frachtseite haben wir im Moment ca. 34,000 Tonnen Fracht pro Monat, etwa gleich viel wie vor Corona. Ich war im Januar/Februar 2020 noch vier Wochen in Indien, wir flogen am 24. Februar 2020 nach Zürich zurück. Noch rechtzeitig bevor die erste Ansteckungswelle begann. Von April bis Juni 2020 ging der Frachtverkehr um ca. 41% zurück. Seit Juli/August 2020, mit mehr Frachtflügen, sind mir beinahe auf dem Volumen von vor der Covid-19 Pandemie zurück. Im Monat März 2021 zum Beispiel operierten 969 Frachtflüge, also etwa 30 oder 31 reine Frachter pro Tag, 15 Ankünfte und 15 Abflüge pro Tag.

Interviewer: Ja, das ist so.

Hungerbühler Marcel: Gegenüber dem Vorjahr (vor Corona) hat sich die Anzahl der Frachter verdoppelt. Was positiv ist, die weggefallene Frachtkapazität auf den Passagierflieger, konnte in kurzer Zeit durch reine Frachtflugzeuge ersetzt werden.

Interviewer: Also Sie meinen, an der Fluktuation von den Flügen?

Hungerbühler Marcel: Genau.

Interviewer: Ich meine, Passagiere konnte man ja nicht ersetzen.

Hungerbühler Marcel: Entschuldigung?

Interviewer: Passagiere konnten wir ja leider nicht ersetzen. Aber Sie meinen ja eher die Fluktuation von den Flügen, oder?

Hungerbühler Marcel: Jawohl. Wie gesagt, im Moment operieren nur wenige Passagierflüge auf internationalen Langstrecken von und nach Bangalore. Und wie gesagt, diese nehmen in normalen Zeiten den grössten Teil der Fracht mit. Nicht Frachtflugzeuge, also zumindest was Indienbetrifft, aber in Zürich ist dies ähnlich. Zürich hat ebenfalls relativ wenige reine Frachter. eigentlich genau gleich. Und, das ist eigentlich die ganze Kapazität, hat man ersetzen können durch Frachtflugzeuge. Von den erwähnten 34'000 Tonnen Fracht pro Monat sind 2/3 internationaler *Frachtverkehr* und 1/3 lokale *Fracht innerhalb Indiens*.

Interviewer: Okay, das ist wirklich spannend

Hungerbühler Marcel: Das hilft uns natürlich, dass wir Fracht mehr oder weniger wieder auf dem gleichen Niveau sind wie vor Corona. Ich möchte noch kurz was nachschauen.

Pause

Hungerbühler Marcel: Wenn ich das Frachtaufkommen in Bangalore im Jahr 2020 mit Zürich vergleiche. In Bangalore hatten wir total 310,000 Tonnen Fracht, das ist leicht mehr wie in Zürich, der Flughafen Zürich hatte 291,000 Tonnen Fracht im letzten Jahr. Wobei dies in Bangalore ein relativ geringer Rückgang war, waren es in Zürich doch minus 35%. Zürich hatte im Jahr 2019 fast 452,000 Tonnen Fracht transportiert.

Interviewer: Ja, dadurch dass halt, ich denke mal das Hauptgeschäft von der Swiss wirklich Passagierflieger gewesen sind, wo die Fracht mitgenommen haben.

Hungerbühler Marcel: Absolut. Und in der Schweiz oder eben am Flughafen Zürich hat man das eigentlich nicht alles durch reine Frachtflugzeuge ersetzen können.

Interviewer: Ja leider nicht. Denken Sie denn, die Swiss hat das dem Fall gut gelöst gehabt, dass sie ihre Passagierflugzeuge umgebaut haben?

Hungerbühler Marcel: Ich denke schon, auf jeden Fall. So haben sie doch einen Teil der Flotte bewegen können. Solange die variablen Kosten gedeckt sind, gibt es wenigstens einen

Beitrag an die Fixkosten. Fixkosten, die nicht in kurzer Zeit abgebaut werden können. Sie werden bei der Swiss einen grossen Teil ausmachen, nur schon die Flugzeugfinanzierung oder die Personalkosten (semi-fix). Und so konnten sie die Flieger bewegen und konnten diese Variable Kosten wie Kerosin, Überflugs- und Flughafengebühren decken. Und man muss auch bedenken, auch Flugzeuge die am Boden stehen verursachen Kosten und müssen technisch überholt werden. Und Piloten brauchen so und so viele Starts und Landungen um ihre Lizenz aufrechterhalten zu können. Es war also eine gute Entscheidung von der Swiss.

Interviewer: *Ja, und ich denke, sie mussten ja sehr viele Flieger parkieren. Weder am Flughafen Zürich, Dübendorf, sie sind ja sogar auf Amman ausgewichen.*

Hungerbühler Marcel: Jordanien, ja. Dies ist vor allem wegen des trockenen Klimas von Vorteil.

Interviewer: *Natürlich, ja.*

Hungerbühler Marcel: Und, die «gegrundeten» Flugzeuge müssen technisch überholt werden bevor sie wieder in den Einsatz komme. Das heisst, dadurch dass sie mehr Flieger bewegen konnten, solange sie die variablen Kosten decken konnten, ist es sicher gut gewesen, ja.

Interviewer: *Ja, super. Ich habe jetzt nur noch eine kleine Frage, eine letzte Frage, ich will nicht zu viel von Ihrer Zeit wegnehmen. Und zwar, das Thema von meiner Bachelor Arbeit ist ja der Einfluss von COVID-19 auf den Europäischen Luftfrachtmarkt.*

Hungerbühler Marcel: Jawohl

Interviewer: *Und, dadurch habe ich eine Hypothese aufgestellt, dass es, ob es einen Shift gegeben hat. Weil wir im Europäischen Markt sind, können ja eigentlich, wenn keine Flieger fliegen, kann man ja auch einfach auf LKW umsteigen.*

Kurze Unterbrechung aufgrund von Verbindungsproblemen

Hungerbühler Marcel: Können Sie die Frage bitte nochmals wiederholen. Was ich verstanden habe, legen sie das Hauptaugenmerk auf den Luftfrachtmarkt Europa, was sind die Auswirkungen von COVID-19?

Interviewer: *Genau, ja*

Hungerbühler Marcel: Okay, ja.

Interviewer: Und zwar, da wir uns ja in Europa befinden, und Europa eigentlich sehr gut miteinander verbunden ist, auch auf Landtransporttechnisch, basiert meine Hypothese eigentlich darauf, ob es einen Shift gegeben hat, weil halt die Flieger nicht fliegen konnten. Das man halt auf LKW umgestiegen ist.

Hungerbühler Marcel: Jawohl, okay, offensichtlich musste die Luftfracht innerhalb Europas vor allem auf LKWs ausweichen. Wobei ich zu wendig im Bild bin über die genaue Situation.

Interviewer: Das macht nichts.

Hungerbühler Marcel: Wer ihnen genaue Zahlen dazu liefern kann ist Peter Somaglia. Leider ist es wahrscheinlich immer noch eine Tatsache, dass selbst ohne Corona, der grösste Teil der Fracht auf der Strasse stattfindet mit LKW. Auf der einen Seite als Feeder für die Langstreckenflugzeuge und auf der einen Seite der Frachtransporte innerhalb Europas. Innerhalb von Europa ist zu unterscheiden, wieviel auf der Schiene, wieviel auf den LKWs und auf den Flugzeugen transportiert wird. Aber meine Schätzung ist, dass der Transport mit Lastwagen und Bahn weit grösser ist als der reine Luftfrachtverkehr. Jetzt rede ich nur innerhalb von Europa. Was jedoch Tatsache ist, Fracht auf den Langstrecken, mindestens bei Grosssendungen, werden sehr oft an die grossen Hubs transportiert, z.B. Frankfurt den grössten Hub auf kontinental Europa. Oder Paris aber auch Zürich. Da kommt ein grosser Teil von Fracht mit Lastwagen aus der Lombardei, also dem Grossraum Mailand. Die Fracht wird auf den LKWs bereits in Flug-Container oder in Paletten transportiert und werden so direkt auf Langstreckenflugzeuge umgeladen. Es operieren kaum Flugzeuge innerhalb von Europa, die die grossen Langstrecken-Palletten an die Hubs transportieren könnten, die danach gleich auf Grossflugzeuge gehen.

Interviewer: Ja, aber die Transporte, wo man jetzt zum Beispiel eine Sendung bei einem Kunden holt und dann zu einem Hub bringt, die laufen doch schon meistens schon unter einer Flugnummer oder?

Hungerbühler Marcel: Das ist richtig, genau. Die Fracht wird gleich behandelt wie, wenn sie mit einem Flugzeug ankommen und umgeladen würde. Das ist an allen Hubs gleich. Da innerhalb von

Europa kaum Grossraumflugzeuge operieren, ist der Transport auf diesen Feeder/Defeeder Strecken auf den LKWs die einfachste Lösung.

Interviewer: Ja genau.

Hungerbühler Marcel: Und darum gibt es für diese Sendungen, wie Sie sagen, nur einem Luftfrachtbrief, für den Transport von beispielsweise Mailand nach Seoul oder Hongkong oder Amerika und unter einer Flugnummer. Zürich ist reiner Transitplatz. Es gibt in Zürich keine Zollabfertigung. Es ist ein einfaches Prozedere; Manifest, alle Dokumente, Luftfrachtbrief und so weiter sind vorbereitet, es findet ein direkter Umlad auf den Langstreckenflug statt. Ich denke, dass Sie in ihrer Arbeit unterscheiden, ob es sich um Luftfracht mit Ursprung und Destination in Europa handelt oder zwischen Europa und Übersee mit Umlad an einem europäischen Hub.

Interviewer: Ja, aber ich denke statistisch gesehen, wenn jetzt eine Sendung, wie Sie sagen im Transit geht an einen Hub. Dann, wird es ja in der Statistik als ganzer Luftfrachtverkehr angesehen und nicht als, Intermodal angesehen demnach.

Hungerbühler Marcel: Das ist richtig. Ich kann Ihnen kurz sagen wie es im Passagierverkehr ist. Wenn wir wieder die Strecke Mailand via Zürich nach Hongkong nehmen, dann, wird der Passagier einmal gezählt bei der Ankunft in Zürich und nochmals beim Abflug. Er wird in Zürich zwei Mal gezählt, einmal wenn er ankommt, einmal wenn er abfliegt. Wenn es dann Ende Jahr heißt, Zürich hat 33 Millionen Passagiere, dann hat man diesen Passagier zwei Mal gezählt. Wie ich mich erinnere ist es bei der Fracht das gleiche. Es ist eine Frachtsendung die ankommt, sich im Transit befindet und weitertransportiert wird. Die Kgs. werden in der Statistik zwei Mal aufgeführt. Vergewissern Sie sich mit Herr Somaglia. Nachher übrigens, unterscheidet man zwischen sogenannten lokalen Passagieren, die von A nach B fliegen, also Passagiere die zwischen Düsseldorf – Zürich fliegen und der Anzahl der Transitpassagiere.

Zürich dürfte etwa 25% Transitpassagiere haben, die in Zürich umsteigen.

Interviewer: Ja, das habe ich auch noch im Kopf. Weil ich habe, noch etwa ein Jahr bei der Swissport gearbeitet im Passagierdienst. Jetzt habe ich noch die aller letzte Frage.

Hungerbühler Marcel: Gerne.

Interviewer: Und zwar, was denken Sie was es für einen Trend in der Zukunft geben wird. Also, denken Sie es wird besser? Denken Sie man muss sich auf die Situation einstellen? Muss man sich einfach an die Situation gewöhnen? Oder, was denken Sie?

Hungerbühler Marcel: Jawohl, unterschiedlich zwischen Passagieren und Fracht oder?

Interviewer: Ja gerne.

Hungerbühler Marcel: Auf Seite der Flugpassagiere wird es sicherlich ein Umdenken geben. Ich kann mir vorstellen, dass innerhalb Europas, das schnelle Reisen, am Wochenende eine Stadt besuchen, zurückgehen wird. Das Bewusstsein, die Umwelt zu schonen wird verstärkt werden. Auch beim Geschäftsverkehr wird es zu Änderungen kommen. Geschäftsinterne Meetings werden öfters via Videokonferenz abgehalten. Auf der anderen Seite werden die persönlichen Kontakte mit Kunden weiter sehr wichtig sein. Corona bedingt mussten wir alle unsere Verwaltungsratssitzungen über Videokonferenz abhalten, was nicht das gleiche ist, wie wenn man sich persönlich vor Ort trifft. Es fehlen die informellen Gespräche vor und nach dem Meeting. Es kommt zu weniger Diskussionen. Auch die persönlichen Gespräche mit der Geschäftsleitung und den Mitarbeitern fehlen. Diese sind ebenso wichtig wie das eigentliche Board-Meeting, wo man sich vor allem auf die vorbereiteten Unterlagen stützt und Entscheidungen trifft. Beim physischen Treffen vor Ort hört man sich vorher die Meinungen an, Argumente werden vertiefter debattiert. Wie es wirklich im Betrieb läuft können Sie nur feststellen, wenn Sie die Belegschaft spüren und mit den Leuten vor Ort reden können. Deshalb werden diese Geschäftsreisen wieder zurückkommen. Da gibt es bereits einen Nachholbedarf, die Leute wollen ihre Außenstellen wieder besuchen und sehen. Allgemein wird man wohl bewusster über die Notwendigkeit der vielen Geschäftsreisen nachdenken und die richtige Balance zwischen Videokonferenzen und dem persönlichen Kontakt finden.

Interviewer: Ja, ich denke, Firmen sparen auch enorm viel Geld so.

Hungerbühler Marcel: Absolut, das ist richtig. Man wird bewusster über die Notwendigkeit der Geschäftsreise nachdenken.

Interviewer: Ich denke, sicher die Impfung wird noch eine Rolle spielen.

Hungerbühler Marcel: Jawohl, impfen und testen werden bestimmen, ob man überhaupt

die Reise antreten kann. Trotzdem könnte Covid-19 uns noch lange beschäftigen.

Interviewer: Das denke ich auch.

Hungerbühler Marcel: Aber irgendwann müssen wir zurück zu einer einigermassen Normalität kommen. Wir können ja nicht drei Jahre lang im Lockdown sein. Irgendwann müssen wir unter Einhaltung der Vorsichtsmassnahmen wieder reisen können und den Geschäften nachgehen. Die Wirtschaft muss wieder vorankommen. Es wird auch von Land zu Land Unterschiede geben. In Indien kommt man kaum um das Flugzeug herum, wenn man von Bangalore nach Delhi, Kalkutta oder Mumbai reisen will. Es gibt kaum Alternativen, die Distanzen sind zu gross und die Reise mit Zug oder Bus zu lange. Trotzdem hat Indien die tiefste, sogenannte Penetration. Das heisst am wenigsten Leute von der Bevölkerung benutzen das Flugzeug. Nur 5% der Bevölkerung unternimmt einen Flug pro Jahr. Also, von 100 Indern unternehmen nur fünf einen Flug pro Jahr. Das ist sehr wenig. Wenn Sie das mit Europa vergleichen, bei uns fliegt jeder Bürger durchschnittlich zwei Mal pro Jahr.

Interviewer: Jeder?

Hungerbühler Marcel: Im Durchschnitt ja. Im Durchschnitt unternimmt jeder Schweizer zwei Flüge pro Jahr.

Interviewer: Das ist schon sehr viel.

Hungerbühler Marcel: Das ist sehr viel. Das gleiche gilt für die USA und ganz Europa. Auch in China ist der Luftverkehr rasant gewachsen. In China ist diese «Penetration» bereits bei 50%, das heisst jeder zweite Chinese macht einen Flug pro Jahr. Bei einem Vortrag sagte der Präsident von Indien, Dr. Kalam, seine Hoffnung sei, dass bis im Jahr 2030 jeder Inder einen Flug im Jahr machen könne. Wenn Sie sich das vorstellen, Indien hat 1,2 Milliarden Menschen, das würde heissen, 1,2 Milliarden Passagiere fliegen innerhalb von Indien pro Jahr. Dazu besteht die Infrastruktur noch bei weitem nicht. China, wo zehn Mal mehr geflogen wird als in Indien, stösst an seine Kapazitätsgrenzen. Aber, in Indien besteht ein grosser Nachholbedarf. Es entwickelte sich eine grosse Mittelklasse, etwa 300 Millionen Leute, die sich eine Flugreise leisten können. Sie wollen ihre Familien und Freunde besuchen und nehmen vermehrt das Flugzeug anstatt mit dem Zug eine Woche lang unterwegs zu sein.

Oder, sie wollen nach Europa, USA, Kanada oder Australien fliegen und dort ihre Verwandten besuchen. Deshalb wird Indien relativ schnell wieder auf das vor Corona Niveau kommen. Sicher, das grosse Wachstum im Luftverkehr in Indien von jährlich 25% wird sich abflachen, das ist auch gut so. Aber es ist anders als in Europa, wo der Markt gesättigt ist und ein Wachstum von 4% auf der Passagierseite schon hoch ist. In Europa wird das Passagieraufkommen stabil bleiben, respektive zurück gehen. Fracht ist es für mich eher schwierig zum Beurteilen. Ich denke aber, dass das Frachtvolumen kaum abnehmen wird. Die Globalisierung wird weitergehen und die Lieferketten weiter Bestand der Wirtschaften sein. Die Entwicklungsländer brauchen moderne Maschinerie aus technischen hoch entwickelten Ländern für ihre Produktion, wir wollen leider billige Produkte von der anderen Seite.

Interviewer: Das gleicht sich dann wieder aus.

Hungerbühler Marcel: Ja, das gleicht sich wieder aus. In wie viel das abnimmt, da habe ich eigentlich meine Zweifel.

Interviewer: Ja, also ich habe, da muss ich Ihnen ganz ehrlich sagen, ich habe mit einem Kollegen darüber gesprochen wo bei Swiss World Cargo arbeitet im Moment, und er war auch wirklich aktiv im Prozess drin mit der Taskforce, mit den Medical Supplies und so während dieser ganzen Coronageschichte. Und er hat gemeint Volumentechnisch, hat sich wirklich nicht viel verändert es hat einfach einen extremen Shift gegeben in der Commodity selber. Also es sind wirklich mehrheitlich nur noch Masken und Handschuhe transportiert worden. Jetzt natürlich halt vermehrt Impfungen und so. Aber volumentechnisch gesehen, hat sich nichts gross verändert, hat er gemeint.

Hungerbühler Marcel: Das ist richtig. Dieser Shift ist logisch und Corona-bedingt. Es werden dringend andere «commodities» gebraucht, wie sie sagen medizinische Produkte, die Produktion von vielen Gütern durch die Lockdowns fiel kurzfristig und vorübergehend aus und die Firmen sind vorsichtig mit neuen Investitionen. Und sobald die Investitionen zurück gehen und zum Beispiel die geplante Anschaffung einer Maschine verschoben wird hat dies eine Auswirkung auf den Warenaustausch und damit den Luftverkehr. Aber irgendwann wird es weiter gehen. Firmen wollen auf dem neusten Stand bleiben und vorbereitet sein auf die Zeit in der der Konsum und die Wirtschaft wieder anziehen. Und vom Shift von dem wir oft hören, dass wichtig Güter wieder lokal produziert werden sollen. Ich denke, das ist

ein kleiner Teil vom ganzen Volumen und wird sich wieder abflachen. Und selbst wenn das gemacht werden sollte, dann braucht es dazu Rohstoffe aus dem Ausland. Eine grosse Menge normaler pharmazeutischer Produkte werden wir auch in Zukunft aus dem Ausland beziehen. Da liest man auch, der Impfstoff soll möglichst in vielen Ländern lokal produziert werden. Dazu braucht es eine Menge von Nebenprodukten aus verschiedenen Ländern, ansonsten kann man das gar nicht produzieren. Und diese bracht man schnell und zuverlässig, wozu nur der Transport per Flugzeug in Frage kommt.

Interviewer: *Natürlich. Ich denke die Pharmaindustrie, gibt im Moment sehr viel Geld aus für Transport von diesen Impfungen. Auf der anderen Seite, die ganzen Fluglinien verdienen sich eine goldige Nase im Moment.*

Hungerbühler Marcel: Ja gut, die Fluggesellschaften haben natürlich grosse Probleme, jetzt wo fast die ganzen Einnahmen wegfallen, weil ein Grossteil der Flotte am Boden steht und die noch wenigen Flüge passagiermäßig schlecht ausgelastet sind. Durch den Wegfall der vielen Passagier-Langstreckenflüge fehlte plötzlich ein grosser Teil der Frachtkapazität. Bei einem knappen Angebot steigen die Preise entsprechend. Es ist eine Frage von Angebot und Nachfrage. Für Firmen in Asien zum Beispiel, die Chips herstellen, ist es entscheidend, dass sie ihre Produkte schnellstmöglich den Kunden ausliefern können. Viele dieser Firmen in Singapur, Malaysia oder Taiwan konnten ihre Produkte vor Corona täglich nach Europa schicken. Wenn nun plötzlich dieser zuverlässige Luftfrachtransport wegfällt gibt das grossen Probleme auf beiden Seiten, beim Produzenten in Asien wie auch beim Kunden in Europa. Im schlimmsten Fall kann das dazu führen, dass Autohersteller wegen den fehlenden Chips Produktionslinien vorübergehend stilllegen müssen. Für solche hoch sensitive Güter sind die Kunden auch bereit, einen entsprechenden Preis zu bezahlen.

Interviewer: *Genau.*

Hungerbühler Marcel: Darum bin ich positiv, was die Luftfracht auf den interkontinentalen Routen betrifft. Für die Firmen und die Volkswirtschaften ist es entscheiden, die Produktion wieder aufnehmen zu können. Sobald dies der Fall, müssen einerseits die Produkte an die Kunden geschickt werden und anderseits braucht es für die Produktion Material und Ersatzteile. Viele Firmen sind auf fremde Märkte angewiesen. Ähnlich ist die Situation für Produzenten von Lebensmitteln in Afrika. Wenn die Produkte

reif sind, müssen sie verkauft werden. Sie sind auf Märkte in Europa angewiesen.

Interviewer: *Ja, irgendwie muss es wieder laufen.*

Hungerbühler Marcel: Wie gesagt, für die Luftfracht bin ich optimistisch. Aber bitte holen Sie andere Meinungen bei Spezialisten ein.

Interviewer: *Genau ja.*

Hungerbühler Marcel: Logischerweise hat es Corona-bedingt eine Verschiebung gegeben bei den Gütern die transportiert werden. Wie vorher besprochen, durch die plötzliche Nachfrage nach Schutzmasken und medizinischen Gütern. Aber dies wird sich bald wieder normalisieren.

Interviewer: *Genau ja.*

Hungerbühler Marcel: Und da diese Güter sofort gebraucht werden, kommt nur der Transport mit Luftfracht in Frage.

Interviewer: *Genau, vor allem halt auch die Menge wo transportiert werden muss.*

Hungerbühler Marcel: Ja

Interviewer: *Da macht Luftfracht eben schon viel mehr Sinn. Ja, nein, dann möchte ich Sie nicht länger aufhalten.*

Hungerbühler Marcel: Sie können mich jederzeit wieder kontaktieren, wenn Sie irgendwelche Fragen haben. Als nächstes wollen Sie wahrscheinlich die neusten Statistiken studieren. Was hat sich in den letzten Monaten Corona-bedingt geändert. Ist die Transitfracht zurückgegangen, wie gross war die Verschiebung beim Frachtaufkommen vom Passagierflugzeug auf Frachtflugzeuge, was ist passiert mit dem Feeder auf der Strasse durch den Wegfall vieler Langstreckenflüge. Was ist passiert innerhalb von Europa durch die starke Reduktion der Flüge. Wie gross war die Verlagerung auf LKWs und die Bahn?

Interviewer: *Also was mir der eine Kollege noch erzählt hat, ist halt, je nach dem, ist vielleicht nicht der eine Flieger von Zürich geflogen, sondern von Paris oder Frankfurt. Und dann hat man es halt trotzdem getruckt, aber auf der anderen Seite, die Grenzen waren ja auch geschlossen. Also immer ist es dann auch nicht immer aufgegangen. Aber was*

denken Sie, was es für Alternativen geben würde, wenn jetzt zum Beispiel, wie soll ich das formulieren, ob Sie denken, ob es noch andere Alternativen gibt als Landtransport?

Hungerbühler Marcel: Was geschieht unmittelbar nach Corona und was verändert sich längerfristig? Das sollten Sie mit Herrn Somaglia diskutieren. Was sind die Zukunftsvisionen für den Transport innerhalb von Europa und Übersee. Beim Überseetransport gibt es seit langem die zwei Haupttransportarten, den Seeweg und die Luftfracht. Und es gibt eine klare Unterscheidung zwischen den Gütern die auf dem Seeweg transportiert werden und solchen für die der Transport per Flugzeug von Vorteil ist. Güter, die eine schnelle Lieferung brauchen werden vorwiegend per Flugzeug transportiert, sowie wertvolle Güter und solche die Teil einer Just in Time Lieferkette sind. Diese Trennung gibt es schon sehr lange. Nun zeichnet sich eine weitere Alternative ab mit dem Ausbau der neuen Seidenstrasse der Chinesen. Wie man liest, brauchen die Züge für die Strecke Beijing nach Duisburg (dem Drehpunkt in Europa) schon heute nur sechs Tage. Mit dem Ausbau und der Modernisierung der Eisenbahntrassen wird die Zeit noch verkürzt und die Kapazität erhöht.

Interviewer: Ja, ich habe gelesen, dass sie das angefangen haben, aber ich wusste nicht, dass sie schon daran sind mit den Gütern.

Hungerbühler Marcel: Ja, diese fahren bereits, ca. 60 Züge verkehren pro Woche, momentan vorwiegend auf bereits existierenden Bahnverbindungen. Der Hafen Duisburg dient als Endpunkt und Logistik-Drehkreuz für die Verteilung innerhalb von Europa. Diese Verteilung kann mit LKWs, der Bahn aber auch dem Seeweg erfolgen. Die Container können direkt auf Schiffe auf dem Rhein verladen werden. Das ist sicherlich eine valable Alternative zwischen dem Seeweg und der Luftfracht. In Europa müssten ja eigentlich die Güter auch vermehrt auf die Schiene gehen, aber leider ist ja die Realität ernüchternd bis jetzt. Aber hier wird in Zukunft sicherlich noch einiges geschehen, wie man ja auch schon in der Schweiz langfristig studiert, ob Güter unterirdisch, wie bei einer Metro, transportiert werden können. Sicherlich ein realistisches Zukunftsprojekt, nur mit sehr hohen Investitionskosten verbunden. So wie ein Tubesystem, in dem die Züge hin und her geschoben werden. Das sind dann langfristige Strategien, was da laufen könnte.

Interviewer: Irgendwo habe ich noch einen Artikel gesehen, bezüglich dem Unterirdischen Ding.

Hungerbühler Marcel: Ja, das ist in der Schweiz ja eine Vision. Und dann gibt es noch das Projekt von Richard Branson, das Virgin Hyperloop Projekt. Beim Hyperloop-Systemen werden Passagiere in Kapseln durch Beinahe-Vakuum-Röhren transportiert, die mit mehr als 600 Stundenkilometern dreimal schneller sind als Hochgeschwindigkeitszüge. Anstatt auf Schienen zu laufen, "schweben" die Kapseln durch eine Magnetschwebetechnik. Die ersten Tests mit Passagieren an Bord fanden in der Wüste von Nevada statt. Wir vom Flughafen Bangalore sind an diesem Projekt involviert. Die gleiche Technologie könnte auch für den Transport von Express-Gütern verwendet werden. Das sind natürlich sehr futuristische Überlegungen, aber es wird zu neuen innovativen Transportformen kommen. In Europa muss man Wege finden, um den Güterverkehr von der Strasse auf die Schiene zu bringen.

Interviewer: Ja das ist so, aber ich glaube das ist doch schon immer ein bisschen das Problem gewesen.

Hungerbühler Marcel: Ja, dazu braucht es eine gute Feinverteilung? Die längeren Strecken, sagen wir von Norditalien nach Deutschland auf die Bahn verlagern, und von Hub die Feinverteilung organisieren. Nur fehlt es offensichtlich schon heute an genügend Kapazität bei den Güter Bahnverkehr.

Interviewer: Ich glaube Güterverkehr auf den Schienen ist auch sehr ausgelastet, ich habe eben vorher. Also ich war selber in der Logistik tätig, ich war erst vier Jahre beim Schenker und habe den LKW-Transport nach Deutschland gemacht, dann war ich bei der Korean Air gewesen und habe Luftfracht gemacht und dann bin ich noch zur Seefracht gewechselt und habe dann eigentlich vom Rheinhafen in Basel aus, Seefrachtcontainer mit dem Zug oder mit der Barge nach Antwerpen oder Rotterdam gebracht. Dort habe ich halt sehr viel mit Zügen zu tun gehabt und musste halt auch feststellen, dass das Netzwerk wo sie jetzt haben ist so, schon sehr ausgelastet und sehr, wie soll ich sagen, nicht sehr zuverlässig, würde ich sagen.

Hungerbühler Marcel: Absolut, wobei für uns in Europa wird es natürlich schon entscheidend sein. Von der Umweltbelastung aus, müssen wir die Lastwagen weg von den Strassen bringen können.

Interviewer: Ja, das ist so.

Hungerbühler Marcel: Wir können nicht immer noch mehr Autobahnen bauen und die Umwelt weiter belasten

End of the Interview

Appendix B: E-Mail, Interview B

Interviewer: Trieu Tu Khanh Jacqueline
Interview Expert: Somaglia Peter
President IG Air Cargo Switzerland
Date: April 21st, 2021
E-Mail Language: German

Confidentiality Agreement

Do you consent that the information provided in the interview can be used for this Bachelor's Thesis?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
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Interviewer: *Was genau macht die IG Air Cargo Schweiz und welche Funktion haben Sie bei dem Unternehmen?*

Peter Somaglia: Die IG ist eine Interessengemeinschaft für Luftfrachtindustrie und hat zum Ziel, die Stellung, Ansehen und Anerkennung dieser Branche in Politik, Wirtschaft und Gesellschaft zu erhöhen. Ich selber bin Präsident der IG seit 10 Jahren.

Interviewer: *Wie wurde der Schweizer Luftfrachtmarkt aufgrund des COVID-19 eingeschränkt bzw. gefördert?*

Peter Somaglia: Tonnageentwicklung ist auf der Webpage einsehbar, Hauptverlierer sind Transferverkehre in Zürich und Genf, hauptsächlich verursacht durch den Wegfall von Langstreckenflügen der Swiss. Gewinner ist der Flughafen Basel mit seinen zusätzlichen Frachtflügen vor allem von QATAR und Turkish Airlines. Stark erhöht hat sich auch der Zu-/Abbringerverkehr per LKW – Road Feeder Service genannt. Damit werden Sendungen von/nach den umliegenden Airports transportiert, von/nach welchen Vollfrachterverbindungen angeboten werden, z.B. Frankfurt, Luxemburg, Paris, Amsterdam, Brüssel. SwissWorldCargo hat clever reagiert und 3 B-777 in «Frachter» umgebaut indem die Economysitze ausgebaut wurden. Be- und Entladung jedoch schwierig, da das grosse Frachttor fehlt.

Interviewer: Was für einen Trend sehen Sie im Bereich des Luftfrachtmarktes im Europäischen Markt? Volumentechnisch, Kapazitätstechnisch?

Peter Somaglia: Europäische Länder mit Vollfrachterverbindungen an ihren Grossflughäfen profitieren von der Entwicklung und die anderen wie die Schweiz verlieren an Bedeutung. Wenn sich eine Routenumstellung mal eingespielt hat ist es meist schwierig, die Kunden wieder zurück zu ehemaliger Lösung zu bewegen.

Nachfolgend ein Link zur Analyse der IATA: <https://www.iata.org/en/iata-repository/publications/economic-reports/cargochart book---q1-2021/>

Interviewer: Viele Fluggesellschaften mussten ihre Routen reduzieren und entsprechend gab es weniger Passagierflugzeuge, welche Fracht transportieren konnten. Meine Hypothese besteht aus der Aussage bzw. Frage, ob es nun einen Shift im Europäischen Luftfrachtmarkt gab, von Luftfracht auf Landtransport (LKW), da diese die im Raum Europa an hoher Beliebtheit geniesst. Was wäre Ihre Meinung zu dieser Thematik? Und welche Alternativen würden Sie in naher oder ferner Zukunft für dieses Problem sehen, wenn die Fluggesellschaften nicht wieder zur ursprünglichen Fluktuation zurückkehren könnten?

Peter Somaglia: Gemessen am Warenwert, werden ca. 30% der weltweiten Transporte per Luftfracht befördert, zumeist aufgrund der Warenart, Verpackung, zeitlichen Vorgabe, denn Luftfracht ist teurer im Vergleich z.B. zur Seefracht. Nimmt man nur die Luftfracht werden 50% auf Frachtern und 50% als Beiladung in den Bäuchen der Passagierflügen transportiert. Während der Corona Krise fielen zu Beginn fast alle Langstreckenpassagierflüge aus, dh. Eine Reduktion von 50% der Kapazität mit Auswirkungen auf Preise und Angebotsverknappung. Ein Teil dieses Kapazitätsverlustes konnte durch die «Wiederbelegung» von ausgemusterten Frachtflugzeugen kompensiert werden aber ich denke die gesamte weltweite Luftfrachtkapazität hat rund $\frac{1}{4}$ abgenommen und wird z.B. verkehrt auf der Bahn (China-Europa) und in Hochseeschiffen transportiert. Auch ist die globale Industrieproduktion gesunken und somit ist auch die Nachfrage nach Luftfrachtkapazität etwas tiefer.

Appendix C: Transcript, Interview B

Interviewer:	<i>Trieu Tu Khanh Jacqueline</i>
Interview Expert:	Somaglia Peter
	President IG Air Cargo Switzerland
Date:	April 21 st , 2021
Location:	Telephone
Interview Language:	Swiss German (Transcribed in German)

Confidentiality Agreement

Do you agree to have the interview recorded for transcription?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
Do you consent that the information provided in the interview can be used for this Bachelor's Thesis?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>

Interviewer: Ja, ich hatte Ihnen ja schon ein paar Fragen geschickt.

Somaglia Peter: Genau

Interviewer: Wollen Sie diese noch tiefer erläutern?

Somaglia Peter: Sie haben die Antworten gesehen, nehme ich an, welche ich Ihnen geschickt habe?

Interviewer: Ja, habe ich vorhin angesehen.

Somaglia Peter: Da können wir nochmals ein bisschen reinschauen, einen Moment bitte. Da haben wir ihn.

Pause, P. Somaglia ist eine E-Mail am suchen

Somaglia Peter: Ja okay, ja ich glaube was die IG Air Cargo macht, das ist kurz beschrieben. Reicht Ihnen das?

Interviewer: Ja, das reicht so.

Somaglia Peter: Okay. Wie wurde der Schweizer Luftfrachtmarkt eingeschränkt bzw. gefördert. Ja, da ist natürlich ein Einbruch gewesen. Haben Sie die Studie, welche wir gemacht haben, Luftfrachtlogistik Schweiz 2020, konnten Sie diese schon anschauen?

Interviewer: Ja, diese haben ich angeschaut, ja. Es sieht aber eher auf den Schweizer Markt ab, oder?

Somaglia Peter: Das ist so, ja. Also die Schweiz konnten wir relativ gut dokumentieren. Weil wir das auch verfolgen, der Einbruch ist natürlich gross gewesen, das ist klar. Vor allem,

eigentlich die Hauptverlierer sind Transferverkehr, diese sind eingebrochen, das haben Sie ja gesehen auf der Statistik.

Interviewer: Ja

Somaglia Peter: Und vor allem eigentlich wegen dem Wegfall von den ganzen Langstreckenflügen von der Swiss. Also in Zürich bedeutet das etwa 70% weniger. Und der Gewinner ist Basel mit den zusätzlichen Frachtflügen, von den Frachtern von der Qatar und von der Turkish. Und diese haben ihr Angebot recht erweitern können, überhaupt alle Frachtergesellschaften sind natürlich im Moment Profiteuren von der ganzen Reduktion von den Langstrecken. Denn Luftfracht ist ja hauptsächlich Langstrecken und nicht Europa oder Kurzstrecken.

Interviewer: Genau

Somaglia Peter: Ja, und wer eigentlich reagiert hat darauf ist eigentlich sehr positiv, ist eigentlich die Swiss, mit dem Umbau von den 777. Also wenn sie vollgeladen ist, dann bringt sie bis zu 60 Tonnen Fracht mit auf der 777.

Interviewer: Das ist eine rechte Menge ja. Wissen Sie denn ob noch andere Airlines in Europa einen solchen Umbau gemacht haben?

Somaglia Peter: Ich bin der Meinung die AirFrance hat das noch gemacht und KLM. Aber da bin ich nicht ganz sicher, da müssten Sie bei ihnen auf der Dings nachschauen.

Interviewer: Okay.

Somaglia Peter: Also wir sind ja keine Marktgesellschaft, sondern eher eine IG wo sich eigentlich auf die, ja eigentlich eher auf die Schweizer Märkte konzentriert.

Interviewer: Ja genau

Somaglia Peter: Also Profiteure sind sicher Basel und ja, die Frachtergesellschaften, die aus dem Ausland hereingekommen sind.

Interviewer: In Zürich, also ich weiss nur Korean Air Fracht ist ja immer noch gelandet in Zürich jeden Sonntag, aber ich denke dieser ist so ziemlich der einzige Vollfrachter gewesen, kann das sein?

Somaglia Peter: Ja es hat wenig, Turkish kommt jetzt auch manchmal, oder hat ihr Angebot eigentlich auch ausgebaut via Zürich. Aber Zürich ist kein Frachter Flughafen und darum hat man eigentlich auch schon reagiert mit Basel. Und dann ist Zürich auch noch teurer wie Basel, also für die Abfertigung.

Interviewer: Ja, okay. Gut. Dann können wir sonst zur nächsten Frage gehen, wo es um den Trend geht welchen Sie sehen?

Somaglia Peter: Ja ich denke die ganzen Umstellungen auf Frachter und auf Road Feeder aber auch die Europäischen Hubs, ich denke da gewöhnen sich die Leute daran. Und wenn sich die Kunden daran gewöhnen an etwas, dann ist es ziemlich schwierig diese wieder zurück zu holen. Also, das denke ich auch wenn die Swiss ihren recht grossen Aufbau wieder macht in der Langstrecke, wenn es dann soweit kommt, wird es nicht ganz so einfach werden diese Luftfracht wieder auf die Direktflüge hinzubringen. Also im Import wie auch im Export.

Interviewer: Also Sie meinen mit den Road Feeder Services, sind das diese wo die Fracht an die grossen Hubs geliefert werden und von dort aus auf Langstreckenflüge weitergeflogen werden.

Somaglia Peter: Genau, denn diese haben natürlich auch eine gewisse, ich sage mal eine moralische Verpflichtung oder Verantwortung, oder irgendwo. Diese haben ihnen jetzt natürlich geholfen Kapazität zu erhalten, also würde ich, also wenn ich jetzt von der Cargolog oder Turkish wäre, würde ich sagen, jetzt gehst du nicht schon wieder weg, sondern du bleibst. Wobei die Treue, die Carriertreue ist relativ tief. Wenn es dann fünf Rappen billiger ist irgendwo, dann ist das dann schon gut.

Interviewer: Also Sie erwähnen jetzt auch den Preis und die Raten sind ja auch extrem gestiegen, weil ja die Kapazitäten nicht verfügbar gewesen sind.

Somaglia Peter: Genau, vor allem am Anfang sind sie gestiegen. Jetzt hat es relativ wieder viel Kapazität verfügbar, weil man auf der Integrator Seite relativ viel zusätzliche Kapazität reingebracht hat, die Middle-East oder die Frachtercarrier wo ihre teilweise stillgelegten Frachter aus der Wüste geholten haben. Und es hat natürlich im Moment, ausser gerade die grossen Verkehre Pharma und Impfstoff, ist eigentlich die Produktion weltweit zurück gegangen. Also die lauft noch nicht auf 100%, und darum hat es auch viel weniger Nachfrage.

Interviewer: Okay, alles klar.

Somaglia Peter: Aber, vor allem so Asien und Europa, hat man natürlich die Zugverbindungen, zwischen China über Kasachstan und Russland nach Deutschland, ist eine enorme Konkurrenz geworden für die Luftfracht. Ist auch preislich und zeitlich vom Transport etwa in der Mitte zwischen Seefracht und Luftfracht.

Interviewer: Also Sie meinen den Belt and Road oder?

Somaglia Peter: Ja, also ja, also die direkten Züge, also eigentlich die Seidenstrasse, die alte Seidenstrasse und auch die heutigen Züge. Die Güterzüge wo zwischen China und Duisburg zum Beispiel oder Hamburg auch operieren. Da braucht man etwa ja, zehn, 12 Tage. Ja, vielleicht ein bisschen länger, so 12 bis 15 Tage.

Interviewer: Von Europa nach China?

Somaglia Peter: Ja, und vor allem natürlich Export China ist hauptsächlich der Verkehr natürlich.

Interviewer: Ja also Sie denken, dass in Zukunft wahrscheinlich mehr vom LKW auf Züge umgestiegen wird mit diesen Verbindungen?

Somaglia Peter: Hm, also Asien und Europa ist ja nicht LKW, das ist vor allem See. Also Seefracht und Luftfracht. Und ich denke, da hat es eigentlich viel wo eigentlich jetzt auf den Zug umsteigen, weil vor allem, China hat ja die ganzen, der Grossteil von der Produktion ist ja eher im Westen von China. Und wenn Sie von dort aus, Richtung Europa wollen, müssen Sie zuerst auf Shanghai oder auf Hongkong oder in den Osten rüber. Und von dort aus dann eigentlich wieder weg. Also sie verlieren, Sie transitieren ganz China praktisch von einer Ecke zur anderen und wenn Sie mit dem Zug direkt ab Xi'An oder so gehen, dann sind sie natürlich relativ schnell, dann in Richtung Russland und dann in Richtung Europa.

Interviewer: Okay, ja. Dann wären ja eigentlich schon bei meiner letzten Frage, welche ich Ihnen geschrieben habe, wo ja eigentlich mehr um meine Bachelor Arbeit geht. Ich habe ja die Hypothese aufgestellt, dass es einen Shift gegeben hat im Europäischen Markt von Luft auf Landverkehr, was Ihre Meinung dazu ist haben Sie mir ja schon geschrieben.

Somaglia Peter: Der Shift an und für sich im, also der Europäische Luftfrachtmarkt, innerhalb Europas gibt es ja praktisch nicht. Es ist an und für sich der Luftfrachtmarkt, wo Sie meinen oder wo Sie ansprechen von und nach Europa hauptsächlich auf der Langstrecke und nicht innerhalb von Europa, nehme ich mal an.

Interviewer: Ja

Somaglia Peter: Dann ist an und für sich, das wo passiert ist, ist das sicher, ja, man kann eigentlich nicht sagen es ist ein Shift von Luft auf Land. Denn es ist ja nur teilweise Land, diese Road Feeder Services die gehen ja nur auf Frankfurt oder Amsterdam oder auf Luxemburg. Und Luft bleibt ja eigentlich. Es ist ja eigentlich nicht auf den Landtransport,

also eigentlich ist es ein Shift auf die Frachterhubs, das ist mal sicher was stattfindet. Es ist sicher eine wesentliche Steigerung von den Road Feeder Service, die Zu-und Abbringer und es ist ein Shift, denke ich Richtung Bahn und Richtung Schiff. Hochseeschiff, ich denke auf den LKW, das wäre innerhalb Europas, ja das ist schon gut. Aber innerhalb Europas ist ja Luftfracht kein grosses Thema. Es schickt ja niemand etwas von Zürich auf Stuttgart mit der Luftfracht.

Interviewer: *Nein, also so wie ich es verstanden habe, auch von meinen Kollegen die bei der Swiss arbeiten, ist ja Luftfracht innerhalb von Europa meistens auf den Passagierflügen einfach mitgeflogen, wenn es halt dringend sein musste. Aber die Mehrheit ist ja wirklich per LKW oder per Zug transportiert worden innerhalb Europas.*

Somaglia Peter: Genau, eben darum ist auch an und für sich die These, ob ein Shift im Europäischen Luftfrachtmarkt passiert ist von Luftfracht auf Landtransport, ist eigentlich nicht ganz richtig. Oder Sie müssen es besser beschreiben.

Interviewer: *Okay, okay.*

Somaglia Peter: Ist es gut so wie ich es ausgedrückt habe, wie ich es versucht habe? Sie müssten in Ihrer These erklären, was Sie mit Europäischen Luftfracht meinen, nicht den Innereuropäischen Verkehr, sondern der Luftfrachtmarkt welcher dies generiert. Import und Export.

Interviewer: *Okay, das ist gut.*

Somaglia Peter: Aber ich denke, dieser Shift, diese Gefahr wo ich dort angeschrieben habe, diese Gefahr ist von mir aus durchaus da, dass es auch zum Teil bleibt. Dass sich die Leute daran gewöhnt haben und Alternativen gefunden haben, und jede Alternative zur Luftfracht ist natürlich wesentlich günstiger auf der einen Seite. Und das zweite Thema wo die Luftfracht auch in Berührung kommen wird in Zukunft, sind die CO₂ Werte. Wenn ich Luft und Zug miteinander vergleiche, dann ist das Verhältnis ja wie 1 zu 100, 1 zu 200. Und das ist sicher auch ein Trend, das noch zusätzlich dazu kommt. Ist jetzt nicht Corona, aber es hilft auch nicht.

Interviewer: *Das gleiche auch mit See wahrscheinlich.*

Somaglia Peter: See ist weniger, See ist der zweiteffizienteste Transportmittel, denn die Hochseeschiff nehmen natürlich so und so viel, wahnsinnig viel Mengen mit, das ist nur ein Schiff und vereinfacht gesagt ein Motor. Also von dem her haben sie pro Tonnen oder pro

kg einen relativ geringen CO2 Ausstoss. Aber wir haben in dieser Luftfrachtstudie ein relativ extensives Kapitel über CO2 und das CO2 in Verbindung mit dem Corona jetzt, ist sicher ein Effekt wo man nicht unterschätzen darf. Das ist vielleicht auch noch ein interessanter Aspekt wo Sie reinnehmen wollen.

Interviewer: Ja, die Emissionen.

Somaglia Peter: Ja.

Interviewer: Ja, das habe ich eben auch noch gedacht. In der heutigen Zeit ist es ja sehr umstritten.

Somaglia Peter: Ja, also wie sagt man, die Aviation, die Airlineindustrie trägt etwa knapp 3% von der ganzen CO2 weltweit bei. Und da davon sind etwa 0.7% Luftfracht.

Interviewer: Das ist aber nicht so viel?

Somaglia Peter: Nein, nein, das ist nicht so viel. Das ist schon richtig. Aber 0.7%, mit einem Faktor von 100- oder 200-mal mehr als See oder Bahn ist natürlich, gibt natürlich trotzdem einen rechten Betrag. Und vor allem ist es in aller Munde, weil im Moment reden wir über, ja, mit den Passagierflügen und man redet ja über das neue CO2 Gesetz, wo dann auch eine Abgabe stattfinden sollte und das hat sicher auch noch einen Einfluss, wird sicher jetzt auch getrieben von Corona.

Interviewer: Ja, ich denke vor allem halt auch durch die ganze Corona Geschichte hat es in der Umwelt Verbesserungen gegeben, die Umwelt hat sich ja sozusagen wie erholt.

Somaglia Peter: Ja. okay.

Interviewer: Also, das was ich in den Zeitungen gelesen habe, dass sich wirklich naturmässig die Ressourcen erholt haben, weil halt auch weniger Flieger geflogen sind und weil auch weniger auf den Strassen gefahren sind etc. und vor allem, weil weniger Touristen und Menschen herumgereist sind.

Somaglia Peter: Ja, das ist eindeutig so, ja. Also das wichtigste vielleicht in einem oder zwei Sätzen, die wichtigsten Konsequenzen und Folgen von dieser Coronakrise auf die Luftfracht, ist schon die Reduktion der Kapazität, durch den Wegfall von den Langstrecken Passagierflügen, wo etwa 50% weltweit Anteil an den Transporten gehabt hat zu den anderen 50% Frachter. Das Wachstum vor allem in Europa jetzt, vor allem in Luxemburg, Frankfurt oder auch Paris, Amsterdam mit ihren Frachter Kapazitäten das sind sicher die beiden Gewinner, sage ich jetzt mal in Anführungszeichen während Corona. Und die Verlierer sind

ja an und für sich die Airlines, also Passagierairline und die Flughäfen, oder auch die Swissport, und die Groundhandler, wo abhängig sind von den Anzahl Passagieren, diese haben am Meisten darunter gelitten.

Interviewer: Ja super, dann reicht mir das eigentlich schon von Ihnen ausser Sie würden gerne noch etwas anderes mit mir teilen?

Somaglia Peter: Da fällt mir im Moment auch nicht so viel Anderes ein. Weil der Grossteil, welchen wir wirklich in dieser Studie gemacht haben, das können Sie dort von den Zahlen herleiten, wir haben dort extra noch einen Corona Kapitel eingefügt, damit man das sieht. Weil eigentlich ist ja $\frac{3}{4}$ von dieser Studie, ist ja vor 2020, das heisst vor Corona. Und 2020, 2021 ist ja eigentlich praktisch nur so eine Momentaufnahme, was für kurzfristige Folgen das hat, aber diese sind nach wie vor gültig.

End of the Interview

Appendix D: E-Mail, Interview C

Interviewer: *Trieu Tu Khanh Jacqueline*

Interview Expert: Marty Sven

Cargo Hub Operation Controller,
Swiss International Airlines

Date: May 11th, 2021

E-Mail Language: English

Confidentiality Agreement

Do you consent that the information provided in the interview can be used for this Bachelor's Thesis?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
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Interviewer: *Which company are you working for?*

Marty Sven: Swiss Intl. Airlines

Interviewer: *Which function do you hold in your company?*

Marty Sven: Cargo Hub Operation Controller

Interviewer: *Which are the biggest challenges your company had to face during the pandemic?*

Marty Sven: The worldwide travel restrictions, lockdowns, quarantine lists, closure of airports and so on. Due to those restrictions, Swiss Intl. Airlines faces an almost complete stop of their operation, from 250 daily flights. The pandemic results in a never seen low operation with only 3-5 daily flights.

Interviewer: *Do you think that your company (in the case of Swiss World Cargo employee) adapted well to this situation?*

Marty Sven: Yes and no, compared to other airlines we are plus/minus in the middle. E.g, Air Canada operated its first cargo in cabin (cargo on the PAX seats) flight already by mid of March, we only in the beginning of April. Others like KLM came even later in May. This general picture runs through this crisis and across the industry. The reaction in general for a non-cargo airline (Swiss) compared to others is neither less nor bad.

Interviewer: *How do you think, was the Swiss Air Cargo Market influenced by the impact of the Pandemic?*

Marty Sven: The reactions to the pandemic were quite different, especially with the beginning of the lockdown in Switzerland, the cargo export market reduced rapidly. Besides of that, the import started to increase week by week with hygienic articles from China. The price per kilo from China to Europe increased from normally 10 CNY (1.40 CHF) to 60 CNY (8.40 CHF) in the first few months of the pandemic. The export market from Switzerland started slowly but steady and started to transport more and more by every week in April and May, there the prices per kilo increased heavily as well.

Interviewer: *What kind of trend do you see for the Air Cargo Market in general for the future?*

Marty Sven: Increased demand for pharma and general cargo overall. The industry now runs on a pre COVID level but the available flights in the market are still low, so there is an imbalance between the volume and the capacity. (Can be also used for the questions below).

Interviewer: *Volume, Capacity?*

Marty Sven: In the past few months, the volume vs. weight changed massively. Due to the unsafe SEA operation and the temporary grounding of all Antonov aircrafts, more heavy shipments switched to air cargo, this generates higher fuel costs but on the other side increases the volume-based capacity on the flights.

Interviewer: *In Switzerland*

Marty Sven: In Switzerland, we reach pre-COVID level already in mid-2021.

Interviewer: *In Europe?*

Marty Sven: In Europe, we reach pre-COVID level by end of 2021

Interviewer: *On a global level?*

Marty Sven: Within 2022 volume and capacity will be on the same level as pre COVID

Interviewer: *Many airlines had to reduce their routes and consequently, a decreasing number of passenger flights were operating which originally transported the freight. Especially within the European Market. The hypothesis in this thesis consists of the claim respectively the question, if a shift was distinguishable from the air cargo to the road freight (Truck) sector in Europe, which is a highly used transport mode in this region.*

Do you agree with this statement?

Marty Sven: No, I do not agree with this statement

Interviewer: Why? What is your opinion about this topic?

Marty Sven: First, the market share of cargo flown in Europe from point to point is quite low. Flights in Europe had an amount of 80% coming from third country cargo (which consequently can't be transported only on RFS), 20% (Europe point to point) did however yes moved on the truck but the commodity is mostly not suitable for RFS. Customers with valuable, pharma and time critical express shipments does not accept RFS as an option and still prefer a flight connection. From time to time, it is cheaper to operate a wide body aircraft on a European route, instead of sending four trucks, to save money. This was regularly done to LHR, AMS, BRU, MXP and VIE. Let's do an example: Transporting a big shipment with four pieces and 2 tons from Sao Paulo via Zürich to Oslo, it definitely can't be transported on the flights to Oslo (mostly A220, open load) so it will be forwarded with a truck. This procedure was implemented and used before COVID and will be after. If the same shipment contains 1000 pieces with 2 tons, customer will prefer the flight, as the risk of losing some packages is too high. Therefore, in generally a good mix of trucking and flights is the best solution in Europe.

Interviewer: Which alternatives do you see in the short or long-term perspective for this issue, if the airlines cannot return to their original fluctuations and offer about the same amount of capacity as before?

Marty Sven: If so, converting aircrafts into freighters is the only option (e.g LH is planning it for its A330) otherwise airlines will loose on market share and freighter only airlines (e.g Cargolux, DHL, Fedex, UPS etc.) has a monopoly. Passenger demand will not be back to pre-COVID level before 2024, so it is definitely an option that has to be taken into consideration.

End of the Interview.

Appendix E: Summary of Codes and Quotes

Theme I: Impact of COVID-19

Shortage of Capacity

The impact which the reduction of passenger flights had on the industry, which consequently lead to a shortage of capacity for the air cargo operations.

Marcel Hungerbühler

- “Whereby, that is of course more related to the scarcity of capacity.”
- “Because there, you see then suddenly, at the beginning where all passenger planes have fallen away, where each has brought 25 tons, it has suddenly all fallen away and nevertheless, there have of course been shipments where they wanted to transport from Singapore or Hong Kong, but they no longer had the capacity.”
- “Yes, well what happened in cargo, so cargo is again more international traffic and the cargo, which is transported on passenger aircrafts, that is more depending on the long-haul flights and makes up around 20 to 25 tons. Of course, this immediately fell away, because the planes of course no longer operated at all. But in the meantime, they have practically been replaced by cargo planes.”
- “Plus, they can, of course, so if the plane is just on the ground, that is not good either. It also has to be technically overhauled again. And pilots must have a specific number of takeoffs and landings, that they can always maintain their license. So, of course, that also helped on this side. So that was certainly a good decision, yes.”

Peter Somaglia

- If we take only air freight, 50% is transported on freighters and 50% as additional cargo in the bellies of passenger flights. During the corona crisis, almost all long-haul passenger flights were cancelled at the beginning, i.e. a reduction of 50% of the capacity with effects on prices and supply shortage. Part of this capacity loss could be

compensated by the “restocking” of decommissioned freighters but I think the total global air cargo capacity has decreased by about $\frac{1}{4}$ and is transported for example by rail (China – Europe) and vessels. Also, the global industrial production has decreased and therefore the demand for airfreight capacity is somewhat lower.”

- (China – Europe) and vessels. Also, the global industrial production has decreased and therefore the demand for airfreight capacity is somewhat lower.”
- “Yes, that is clearly the case, yes. So, the most important, perhaps in one or two sentences, the most important consequences of this Corona crisis on air freight is already the reduction of capacity, by the elimination of the long-haul passenger flights, which are about 50% of the worldwide share in transportation, whereas the other 50% are freighters.”
- "The Middle East or the freighter carriers where their partially decommissioned freighters have come out of the desert.”

Sven Marty

- The worldwide travel restrictions, lockdowns, quarantine lists, closure of airports and so on. Due to those restrictions, Swiss International Airlines faces an almost complete stop of their operation, from 250 daily flights. The pandemic results in a never seen low operation with only 3-5 daily flights.”
- “Industry now runs on a pre-COVID level but the available flights in the market are still low, so there is an imbalance between the volume and the capacity.”

Price / Rates

As a result of the shortage in capacity, prices increased in the air freight sector

Marcel Hungerbühler

- “As long as they can cover the variable costs, they at least get something out for their fixed costs. Because they still have fixed costs.”
- “And fixed costs, let’s say from Swiss, are of course a large part, so the aircraft financing itself. And then, well, you take that as semi-fixed, but ultimately Swiss has to look at that as fixed costs, which are pilots, respectively the staff.”
- “It’s always supply and demand. If it is very crucial for a company that I get 5 tons on a plane every day, and that is absolutely crucial for me, if I really want to transport that, I have a huge frustration, then they are also willing to pay something for this reliability. So, I think, if we now for example talk about, the whole chip production, or, one says yes in Europe the chips, they do not have it at all. We need these from the countries that produce them, and these are largely in Asia, and we cannot produce at all if we do not receive these chips, right.”

Peter Somaglia

- “Exactly, especially in the beginning they went up. Now there is relatively a lot of capacity available again, because on the integrator side there has been relatively a lot of additional capacity being brought in. The Middle East or the freighter carriers where their partially decommissioned freighters have come out of the desert. And of course, at the moment, except of the large pharmaceutical and vaccine shipments, production has actually declined worldwide. So, it is not running at 100% yet, and that is why there is much less demand.”
- “Exactly, because these have of course also a certain, I would say moral obligation or responsibility. These have helped them now of course to get capacity, so I would, if I were from Cargolog or Turkish

Airlines, I would say, now you do not go away again, you stay. But the loyalty, the carrier loyalty is relatively low.”

- “If it is five cents cheaper somewhere, then that is good.”
- “In terms of the value of goods, about 30% of global shipments are carried by air freight, mostly due to the type of goods, packaging, time constraints, because air freight is more expensive compared to e.g. ocean freight.”
- In terms of price and time of transport, it's about halfway between sea freight and air freight.”

Sven Marty

- “The price per kilo from China to Europe increased from normally 10 CNY (1.40 CHF) to 60 CNY (8.40 CHF) in the first few months of the pandemic.”
- “The export market from Switzerland started slowly but steady and started to transport more and more by every week in April and May, there, the prices per kilo increased heavily as well.”

Shift of Commodities

Different commodities were preferred from the start of the pandemic until now.

Marcel Hungerbühler

- “other goods have become very important.”
- “As you say, medical goods, protective masks and everything else that is needed for hospitals, there has simply been a great demand there. And there too, of course it has to go fast, and then it is actually practically only possible by air.”
- “But what you are probably saying, logically as you alluded to, there has been a shift from the nature of goods, so from the commodities.”

Sven Marty

- “The reactions to the pandemic were quite different, especially with the beginning of the lockdown in Switzerland, the cargo export market

reduced rapidly. Besides of that, the import started to increase week by week with hygienic articles from China.”

Rethinking

People had to adjust to the situations and automatically had to rethink their way of acting. Also, companies had to adjust their business operations accordingly to the situations.

Marcel Hungerbühler

- “Yes, well in terms of passengers, there will certainly be a general rethinking.”
- “So, I can already imagine, let’s say now within Europe, fast travelling, going to visit city for the weekend. All these short trips back and forth in two days, that will certainly decline. I also think that purely niche traffic, vacation traffic, city traffic, I think that there is a rethinking already.”

Peter Somaglia

- “Yes, and who actually responded to that is actually very positive, is actually Swiss, with the conversion of the 777's. So, when it's fully loaded, it brings up to 60 tons of cargo on the 777.”
- “Swiss World Cargo has reacted clever and converted three B777 into ‘freighters. Economy seats have been removed.’”
- “I believe Air France still did that and KLM. But there I'm not quite sure, you would have to check with them on the Website.”
- “Yes, it has little, Turkish now also sometimes comes, or actually expanded their offer via Zurich. But Zurich is not a freighter airport and therefore one has actually already reacted with Basel. And then Zurich is also more expensive than Basel, for the handling.”
- “Yeah, I think all the changes to freighters and to road feeders but also the European hubs, I think people get used to it. And when customers get used to something, then it is quite difficult to get them back. So, I

think that even if Swiss is able to operate its long-haul flights again, when it comes to that, it will not be quite so easy to bring the airfreight back to the direct flights. So, in Import as well as Export.”

- “But I think this shift, this danger which I described, this danger is definitely there from my point of view, that also remains partly. That people have gotten used to it and have found alternatives, and any alternative to air freight is of course cheaper on the one hand.”
- “So, benefiters are certainly the airport in Basel and yes, the freighter companies from abroad.”

Sven Marty

- “Yes and no, compared to other airlines we are plus / minus in the middle. E.g., Air Canada operated its first cargo in cabin (cargo on PAX seats) flight already by mid of March, we only in the beginning of April. Others like KLM came even later in May. This general picture runs through the crisis and across the industry. The reaction in general for a non-cargo airline (Swiss) compared to others is neither less nor bad.”

Fine Distribution

Trucking is one of the most preferred transportation modes in the region of Europe, this due to the ability to finely distribute the goods from door to door.

Marcel Hungerbühler

- “Yes, but then afterwards it just needs a good fine distribution, right? Where the longer distances, say northern Italy, Germany could bridge. But afterwards, of course it needs a fine distribution or, because until you are at the place where the goods must be, that is certainly a problem. And then I think we read, also the railroad capacity is partly not there yet, where many trains can be sent on the way on the main axes.”

Procurement from different countries

In order to produce the different vaccines, producers are reliant on the procurement of the necessary ingredients, which requires an intact global supply chain.

Marcel Hungerbühler

- “There you also read, the vaccine, there are a bunch of by-products coming from different countries, otherwise you can't produce that at all.”

Tonnage transported

The volume of transportation, which was mentioned during the interview.

Marcel Hungerbühler

- “Zurich Airport had about 291,000 tons of cargo last year, yes in 2020. Whereas with us it's an almost, so not that far back, in Zurich it is minus 35% after all. So, Zurich had 451,000, almost 452,000 tons of cargo transported in 2019.”
- “As I said, at the moment, of course, we have no long-haul international flights, or only very few. And as I said, these otherwise actually take most of the cargo.”

Sven Marty

- “In the past few months, the volume vs. weight changed massively. Due to the unsafe SEA operation and the temporary grounding of all Antonov aircrafts, more heavy shipments switched to air cargo, this generates higher fuel costs but on the other side increases the volume-based capacity on flights.”

Maintenance of Aircrafts

As a result of the reduction of operating passenger aircrafts, many fleets had to stay on the ground, causing running costs for the airlines. This did not prevent the company from undergoing maintenance.

Marcel Hungerbühler

- “Plus, they can, of course, so if the plane is just on the ground, that is not good either. It also has to be technically overhauled again. And pilots must have a specific number of takeoffs and landings, that they can always maintain their license. So, of course, that also helped on this side. So that was certainly a good decision, yes.”
- “Yes, this is mainly because of the temperatures, of course it is not humid there. The areas which are relatively dry, to locate the aircrafts on the ground.”
- “And so, they could move the planes, but they still have at least a part of the costs which they generally have, to cover all the variable costs.”

Different Meeting Approaches

Due to the scarce capacity of passenger flights, companies had to adjust their meeting approaches on a remote level.

Marcel Hungerbühler

- “So, there will be less flying for sure, but I just see that today when... we've had now the year, and last year, all our board meetings via video conference, but that's not the same as when they're there on site. It's completely different. Well, our people, prepare this very well, but there are never the same discussions, you hold back, is decided. But when they now, when we all, we were sitting on the board of directors physically meet, then all the discussions which we have with the employees, with the management, or among each other, those are just as important, so those are even much more important than then the pure board meeting, where you have the documents and then you have to decide. And there we still do physically, we still talk to each other physically beforehand. You listen to opinions beforehand and all that doesn't take place today.”
- “Plus, you can only decide, say now so, how is your business doing, how is it solely financial wise, is everything alright. You can only

determine that if you also have the feeling and can talk to the people on the ground. So, when things get a bit more normal again, I think the business trips would come back. Simply, there has been a pent-up demand, people want to visit and see their field offices again, but will certainly for less important meetings, will certainly be a bunch, yes increased, on the video conferences, where you can see that actually yes, it's going well. That will certainly come up more.”

- “Plus, you can only decide, say now so, how is your business doing, how is it solely financial wise, is everything alright. You can only determine that if you also have the feeling and can talk to the people on the ground.”

Theme II: Alternatives in Transportation

Road Feeder Services (RFS)

As the capacity of passenger flights was a scarcity among the world, RFS got popular as they were able to transport air cargo to European Hubs for a further transportation process.

Marcel Hungerbühler

- “So, in other words, the big trucks where you see at the airport in Zurich, when they arrive, from the whole northern Italian area as an example but also from Austria or Germany. The same into Frankfurt, they arrive as if they had been transported in an airplane. In other words, as if they had been transported in a wide-bodied aircraft. But because there are practically no wide-body aircraft in Europe, we can't transport pallets, can we?”
- “And of course, this has already taken place before, simply for the pure reason that large shipments are already palletized directly.”

Peter Somaglia

- “Yeah, I think all the changes to freighters and to road feeders but also the European hubs”
- “Exactly, because these have of course also a certain, I say a moral obligation or responsibility, or somewhere. These have helped them now of course to get capacity, so I would, so if I were now from the Cargolog or Turkish, I would say, now you don't go away again, but you stay. But the loyalty, the carrier loyalty is relatively low.”

Sven Marty

- “First, the market share of cargo flown in Europe from point to point is quite low. Flights in Europe had an amount of 80% coming from third country cargo (which consequently can't be transported on RFS), 20% (Europe point to point) did however yes moved on the truck but the commodity is mostly not suitable for RFS. Customers with

valuable, pharma and critical express shipments does not accept RFS as an option and still prefer a flight connection. From time to time, it is cheaper to operate a wide body aircraft on a European route, instead of sending four trucks to save money. This was regularly done to LHR, AMS, BRU, MXP and VIE.”

Different Transportation Modes – Trends for the Future

This question aimed about the opinion of the interviewees which alternative transportation modes or trends they would see for the future.

Marcel Hungerbühler

- “These are already driving, of course more now on the existing rail connections. But they are already driving today. China, I think they go to Duisburg in Germany and from there it is distributed. So, they are already driving today. And they certainly get it there in six days, which is not bad of course. That is, then there is another way, what has to go very quickly and what has to go very reliably, that still goes on the plane. Then there is an intermediate situation, which goes on rail, so what comes from Asia or from China specifically. And then still sea transport.”
- “In Europe, everything should actually go by rail, everything else makes no sense, but unfortunately the reality is sobering so far. But this must certainly be expanded, which is already being studied in Switzerland in the long-term, whether to do so with a metro underground. But there, you have to be realistic, it costs a lot of money. Just like a tube system does, which pushes the trains back and forth. Those are then long-term strategies, what could run there.”
- “Yes, that was a vision in Switzerland.”
- “Of course, these are quite futuristic considerations, but I think, in the short-term, I do not think that there will be a huge change. In Europe, that is just the only thing where you would have to think about, going much more by rail.”

Peter Somaglia

- “But, especially so Asia and Europe, you have of course the train connections, between China via Kazakhstan and Russia to Germany, has become an enormous competition for air freight.”
- “That is so yes. So, in Switzerland, we were able to document it relatively well. Because we also follow that, the slump has of course been big, that is clear. Above all, actually the main losers are transfer traffic, these have collapsed, you have seen that on the statistics.”

Sven Marty

- “Due to the unsafe SEA operation and the temporary grounding of all Antonov aircrafts, more heavy shipments switched to air cargo, this generates higher fuel costs but on the other side increases the volume-based capacity on flights.”
- “From time to time, it is cheaper to operate a widebody aircraft on a European route, instead of sending four trucks to save money.”
- “Converting aircrafts into freighters is the only option (e.g., LH is planning it for its A330) otherwise airlines will lose market share and freighter-only airlines (e.g., Cargolux, DHL, FedEx, UPS etc.) has a monopoly. Passenger demand will not be back to pre-COVID level before 2024, so it is definitely an option that has to be taken into consideration.”
- “In Europe we reach pre-COVID level by the end of 2021.”

Theme III: Sustainability

Environmental Issues

Sustainability gained on attention in the recent years. Furthermore, the impact of COVID-19 showed that due to the reduction of travelling, the environment was able to regenerate themselves to a certain level.

Marcel Hungerbühler

- “We cannot keep building more and more highways, congesting them even more, and in terms of environmental impact, of course, there will come a point when it is no longer possible.”
- “Also, purely from an environmental point of view. With business traffic, I also think that there will be a change, but otherwise I do not think so yes... So, there will be less flying for sure...”
- “Absolutely, but for us in Europe it will of course be decisive. In terms of environmental impact, we have to be able to get the trucks off the roads.

Peter Somaglia

- “Yes, so as you said, the aviation, the airline industry contributes about just under 3% of the whole CO2 worldwide. And of that, about 0.7% is air freight.”
- “No, no, it is not that much. That is already right. But 0.7% with a factor of 100 or 200 times more than sea or rail, is of course a right amount. And above all it is on everyone’s lips, because at the moment, we are talking about the new CO2 law concerning the passenger flights. Where then also a levy should take place and that certainly also has an influence, additionally certainly now also driven by Corona.”
- “And the second issue where air freight will also come into contact in the future are the CO2 values. If I compare air and train, then the ratio is 1 to 100 or 1 to 200. And that is certainly a trend that will be added.”

- “Sea is less, sea is the second most efficient means of transport, because the vessels of course take insane amounts, that is just a ship and simplified one engine. So, from that point of view, they have a relatively low CO2 emission per ton or per kg. But we have in this air freight study a relatively extensive chapter on CO2. And the CO2 in connection with the Corona now is certainly an effect where one must not underestimate. That is perhaps another interesting aspect that you would like to include.”

Traveling Behavior

The frequency of people travelling as well as the travelling behavior in general.

Marcel Hungerbühler

- “So, when things should get a bit more normal again, I think that the business trips would come back. Simply, there has been a pent-up demand, people want to visit and see their different branches again. But certainly, for less important meetings, will be using increasingly video conferences. You can see that this is actually going well, that will certainly come up more.”