A study reviewing passenger behaviour and perspectives with respect to air travel demand after COVID-19.

A dissertation presented by

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ABSTRACT

A study reviewing passenger behaviour and perspectives with respect to air travel demand after COVID-19.

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The COVID-19 pandemic has had a major impact on the global airline business with continuous travel restrictions imposed by national governments causing significant fall in passenger air travel demand (IATA, 2020). For as long as COVID-19 remains a health risk, passenger confidence will be dramatically impacted with issues such as health concerns, fear and lower levels of household income all inevitably affecting air travel demand (Suau-Sanchez et al., 2020).

The purpose of this study was to identify differences in the type of passengers willing to travel by air after COVID-19. This research also explored how the reduced national government restrictions combined with the vaccination rollout have affected passengers' decision to travel by air. The study compared different groups of passengers with factors identified to affect passengers decisions to travel by air in a need to identify behavioural differences between demographic groups.

A quantitative method was selected as appropriate and a portion of the population answered an online questionnaire, out of which 283 responses were collected, variables were created and analysed, measuring and statistically explaining the relationship between the factors affecting passengers in resuming air travel and identifying any differences between demographic groups such as gender, level of education, marital status and age groups using SPSS and a nonparametric Kruskal-Wallis H test.

Our research identified differences in passenger behaviour between single and married or in a civil relationship participants as well as between age groups 18 to 34 years old and 35 years old and above. No differences in groups of gender or level of education were recorded. It was also determined that lifted government restrictions combined with the vaccination rollout has not affected passengers positively regarding resuming air travel. We hope that this paper provides insight in demographic differences and passengers' willingness to resume air travel leading to further studies monitoring passenger behaviour after COVID-19 in a need to recover air travel demand.

Submission of Thesis and Dissertation

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(Thesis/Author Declaration Form)

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1. INTRODUCTION

1.0 - BACKGROUND TO THE STUDY

In March 2020 the COVID-19 respiratory virus was declared a global pandemic by the World Health Organization (WHO, 2020). As a rapidly spreading airborne disease, it quickly affected global economic development (Yang et al., 2020). Since the beginning of 2020, COVID-19 has infected more than 200 million people with over four million deaths recorded up to mid-August 2021 (worldometers, 2021). Starting off with no effective therapies or vaccines, governments imposed social distancing measures with stay-at-home policies in order to control the transmission of the virus and delay the spread between people, as many healthcare systems instantly exceeded their available capacities (Askitas et al. 2020; Klein et al., 2020).

The COVID-19 pandemic has affected the global population, striking many industries with major effect on the aviation industry (Maneenop and Kotcharin; Bauer et al., 2020). People's travel behaviour has been drastically affected by the COVID-19 pandemic, given how transportation demand is directly connected with societal activity (Sung and Monschauer, 2020). The pandemic disrupted many travel plans and forced people to reschedule or cancel their travel plans abruptly. Libardo and Nocera (2008) highlighted this correlation between changes in economic activities and Gross Domestic Product (GDP on the one hand, and demand for different types of transportation on the other (Libardo and Nocera, 2008). Studies conducted in China confirmed that banning domestic air travel slowed the spread of the virus in that country (Lau et al., 2020) while international travel restrictions effectively delayed the spread of COVID-19 from China to the rest of the world (Chinazzi et al., 2020).

The pandemic changed the travel behaviour of passengers travelling by air, with demand characteristics shifting and travel psychology altering the kind of passengers that continued to travel (Politis, Georgiadis et al., 2021). To understand the effects of COVID-19 in the aviation industry, extended research will need to be conducted to

provide support to future operations of airlines as well as airports (Akbar, Kisilowski, Bauer et al., 2020). Being able to understand the influence of the pandemic on passengers' preferences and decisions is crucial for the travel industry and even more for the aviation industry growth which has been significantly affected (Bauer et al., 2020).

In comparison with the 2008 global financial crisis which affected the airline industry economically as spending power was reduced drastically, some authors contend that COVID-19 has irreversibly affected consumer behaviour regarding air travel (Bouwer, Saxon and Wittkamp, 2021). The aviation industry will need to adapt to the new reality of COVID-19.

Based on the issues addressed above and the gap in research identified, this dissertation will examine how the COVID-19 pandemic has affected airline passenger demand and travel behaviour globally. This study will identify the factors that affect different types of passengers in their decisions regarding resuming air travel. The paper will offer the airline industry as well as the general aviation and tourism industry insight on which type of passengers they should focus their strategies on and which factors they should be considering, monitoring and developing while pursuing air travel demand growth.

The COVID-19 pandemic is still ongoing, with constant changes in government restrictions and ability for passengers to travel by air. This research will enhance the reader's understanding on people's intentions regarding traveling by air and help the aviation industry as well as other sectors affected to develop policies or other type of guidance leading to the recovery of travel. The core component of this study comprises responses of 283 participants on a survey regarding their concerns with respect to resuming air travel.

1.1 - DISSERTATION STRUCTURE

The paper is structured in chapters as follows:

CHAPTER 1 provides an introduction on the chosen research subject explaining the ongoing COVID-19 situation and giving a brief overview of the gaps identified in literature justifying the selection of the specific research topic chosen and highlighting the broader occurring problems of changes in passenger behaviour and air travel demand due to COVID-19 that are worth of studying.

CHAPTER 2 will analyse the broader field of study, exploring the ongoing situation of the COVID-19 pandemic and lockdown restrictions from March 2020 onwards, providing an analysis on the fluctuations of global air travel demand during this time. An in-depth review of emerging literature is carried out analysing information on passengers' behaviour regarding global air travel demand during the COVID-19 pandemic period.

CHAPTER 3 describes the research aim of the study. The primary objective is analysed, the research question is clearly stated, and the main hypothesis assumption is identified.

CHAPTER 4 details the research methodology selected as appropriate to the objectives of the research, describes the tailor-made online questionnaire used, the dataset sources and how the quantitative data was collected. It continues with the data analysis approach adopted, which is based on established frameworks, as well as any occurring limitations.

CHAPTER 5 presents the findings to my statistical analysis, describing the quantitative analysis outlined during the research and answering the research question and hypothesis that was originally set out.

CHAPTER 6 includes further discussion on the results of the study, and considers previous studies and literature. The results are critically analysed, the limitations of this paper are explained, and direction is given for future research and study. ***CHAPTER 7*** provides a summary of what this research found and the conclusion of the study highlighting areas for future research and study.

CHAPTER 2. LITERATURE REVIEW

2.0 - INTRODUCTION

From when COVID-19 entered our lives unexpectedly affecting many aspects of it, there are significant pieces of literature constantly researching the global but also personal effects the pandemic has caused to individuals and our society. However, a lack of research was noticed on the constantly changing passenger behaviour regarding air travel due to COVID-19. This literature review aims to identify the links between the changes in air travel demand and passengers' willingness to travel by air, while identifying any significant demographic differences recorded, affecting air travel demand.

2.1 - INTERNATIONAL AIR TRANSPORT ASSOCIATION (IATA) FIGURES AND RESEARCH

IATA FIGURES

Air traffic demand in 2020 marked the most abrupt traffic decline recorded in aviation history (IATA, 2020). According to IATA figures, demand dropped 65.9% compared to 2019 with international passenger demand falling 75.6% from 2019 to 2020 and domestic demand dropping 48.8% (IATA, 2020). IATA's forecast for 2021 expects a 50.4% improvement from 2020 demand which will be 50.6% of 2019's demand (IATA, 2020). With continuous changes to countries travel restrictions based on the emergence of new variants of COVID-19, demand recovery continues to be at risk, potentially leaving the industry's improvement levels below the predicted percentages (IATA, 2021). Alexandre de Juniac, IATA's Director General and CEO described last year ''as a catastrophe'' as travel restrictions dramatically increased throughout the year due to the fear of new COVID-19 outbreaks (Juniac, 2021). He added that while the virus threat remains, governments are not confident in opening

their borders, leaving passengers locked down and facing continuous global uncoordinated travel restrictions (Juniac, 2021).

IATA SURVEY JULY 2020

The International Air Transport Association (IATA) conducted an 11-country survey in June 2020 and released findings on travellers concerns regarding air travel and COVID-19 in July 2020. Travellers were mostly concerned over the risk of contracting COVID-19 during air travel. 58% confirmed that they are avoiding air travel for this reason, while 33% suggested they will continue to avoid air travel in the future to reduce the chances of them getting infected (IATA, 2020). Their main concerns regarding travelling from an airport included using airport toilet facilities (38%), queuing at the check-in desks, security controls and passport controls (42%) and arriving to the airplane using a crowded bus or train (59%) (IATA, 2020). Regarding on board travel, 37% of the travellers were concerned of the air they would breathe during the flight, 42% of using the toilet facilities while 65% agreed that their main concern was sitting next to an infected with COVID-19 individual (IATA, 2020).

Survey respondents identified the safest measures for them to travel by air to be COVID-19 airport screening (37%), mandatory use of facemasks (34%) and on-board social distancing (33%) (IATA, 2020). Having clear concerns regarding travelling by air people were willing to be subject to further procedures, with a 43% agreeing in receiving temperature checks, and a 42% confirming they would use a face mask during travel. 40% would check-in online and not risk waiting in queues at the airport, 39% would prefer to take a COVID-19 test before travelling and a 38% confirmed they would personally sanitize their seat area before travelling (IATA, 2020). While IATA's survey identified many factors influencing passengers' decision regarding travelling by air, no details were presented on the types of passengers affected by these factors and whether there were groups of passengers not affected by them.

The International Civil Aviation Organization (ICAO), national governments and the aviation industry itself introduced measures such as mask-wearing, contactless travel

processes as well as screening measures trying to support global air travel and restore passenger confidence. Following concerns regarding the aircraft cabin air quality and social distancing on board, passengers were reassured modern aircrafts exchange the air on board with fresh one every 2 to 3 minutes while High Efficiency Particulate Air (HEPA) filters fitted on aircrafts captures the coronavirus plus 99.99% of germs (IATA, 2020). Because of these measures, air cabins are protected from different types of viruses, bacteria and fungi (Mangili et al., 2016).

ICAO and the World Health Organization (WHO), working with the aviation industry and governments, have managed to limit the risk of on-board infections and have tried to create a safe and secure environment for all passengers to feel confident in travelling by air through the above processes. The survey highlighted post-pandemic passenger demand for visiting friends and family at a 57%, for vacations at a 56% and for business a 55% (IATA, 2020). The research also highlighted that returning to their old travel lifestyle would take time. 66% indicated less traveling after COVID-19, while 64% seemed affected by economic factors, postponing travel to once the situation is improved and believing that this will happen on a broader scale (IATA, 2020).

AIR TRAVEL DEMAND 2021

IATA announced an improvement in domestic air travel demand in April 2021 onwards, compared to international air travel demand, due to government restrictions still in place for international travel (IATA, 2021). Following this recovery in demand, IATA's General Director Willie Walsh announced his belief that people will start travelling internationally once given the freedom to do so and we will witness instant increase in demand (Walsh, 2021). In the U.S.A where the initial vaccine rollout was speedy, domestic air travel demand increased immediately with demand numbers expecting to recover completely by the end of 2021/early 2022 (IATA, 2021). On the contrary countries such as Brazil and India where COVID-19

cases continued to rise and new variants were identified, further restrictions and a further decline in air travel demand was recorded (IATA, 2021).

2.2 - PREVIOUS CRISES EFFECTS ON POPULATION AND TRANSPORTATION

CRISIS EFFECTS

As restrictions are eased it remains to be seen to what extent the COVID-19 crisis has affected global aviation. Air travel demand recovery will depend on a number of factors, ranging from the percentage of risk passengers are taking when travelling by air, to the economic cost they will occur, how convenient the flight might be for their specific needs and what safer or cheaper alternative transportation options they have – all of these factors, will all affect passenger decision making (Fenichel et al., 2013). Previous crises such as terrorist attacks on London's Underground train system in 2005, led to changed commuter patterns for months, with bike use increasing 13% in a month after the London attacks (Sung and Monschauer, 2020). While cycling trips record a 9% annual increase that year, however, long-term commuting patterns returned to original levels with cycling registering a 2.5% of all transport preferences in London in 2018 (Sung and Monschauer, 2020).

The effect on the public of any type of crisis compared to COVID-19 could depend on how risk is perceived. The higher risk in contracting COVID-19 on aircrafts, airports as well as any mass transport mode, - compared to other transport modes that might seem safer, can have a long-lasting effect on transport behaviours, explained as '**dread behaviour**' (Sung and Monschauer, 2020). Governments have already taken measures in reducing public transport use, while surveys around the world show people using less public transport leading to an increase in car sales from 2020 onwards (Sung and Monschauer, 2020). These dread behaviour examples suggest how behaviours might shift due to the impact of COVID-19 when lockdowns are ended. Changed economic conditions, lockdowns, government restrictions and mental stresses all affect people's behaviours and create a need for people to develop coping mechanisms in this ongoing crisis (Rana, Bhatti, Aslam et al, 2021).

Understanding the factors that passengers recognize as risk before deciding to travel by air will offer the airlines and the aviation industry overall insights on developing coping mechanisms for passengers to reduce the sense of fear.

SEVERE ACUTE RESPIRATORY SYNDROME (SARS)

Transport behaviours change either due to transport disruptions or due to risk of travelling. In recent history we can identify a number of crises that materially affected transport demand. Mass transportation such as air transport, where passengers are forced into close proximity between each other, gives rise to immediate behavioural changes during a crisis, especially if transport being taken is perceived as non-essential (Lamb et al., 2020). The recent crisis most comparable to COVID-19 is the Severe Acute Respiratory Syndrome (SARS) outbreak in 2003, where air travel demand was affected by 35% in affected regions. It was identified that passenger behaviour continued to be reduced for at least six months after the epidemic was eased, affecting all non-essential travel. It took approximately four months for travel to return to pre-crisis levels (Sung and Monschauer, 2020).

These behavioural changes depend on the measures implemented in support of a resumption of travel. Health checks could offer feelings of security to some passengers. However, such procedures could be considered complicated and time consuming for other air travel passengers, who might choose to avoid air transport due to such checks (Sung and Monschauer et al., 2020).

Even though aviation demand bounced back quickly after other outbreaks such as Avian Flu in 2005, 2013 or the Middle Eastern Respiratory Syndrome in 2015, passenger' behaviour due to COVID-19 is more likely to resemble to SARS, given that the risk and consequences of contagion are significant (Sung and Monschauer, 2020).

2.3 - RESTRICTIONS AFFECTING AIR TRAVEL DURING COVID-19

TRANSPORTATION ACTIVITY REDUCTION

National and local authorities worldwide imposed regulations to ensure social distancing and reduce passenger capacity across most types of transportation activity. COVID-19 transmission rates critically increase when social distancing frameworks are not ensured and transportation trips are frequent (Thakkar et al., 2020). Netherlands detected a drop of 55% on the number of trips people were making in a three-day period as well as a drop of 68% in the distance people were travelling during the same period of time, confirming changes in people's travel behaviour compared to the same period in 2019 (De Haas et al. 2020). De Haas explained that all-purpose travel decreased with many survey samples around the world confirming lessening of any type of activity even reduced grocery shopping (Parady et al. 2020). Shopping was identified globally as the primary reason for commuting during the COVID-19 pandemic period (Abdullah et al. 2020). All-purpose travel, including air travel, was significantly affected worldwide. As government restrictions are lifted, further research will help to identify how behaviour is bouncing back regarding all-purpose travel.

QUARANTINE

A key current concern regarding air travel is the need to quarantine. Surveys conducted by IATA in 2020 confirmed that only 17% of passengers were willing to quarantine as a requirement for them to continue to travel, while 85% of passengers were concerned at having to quarantine while travelling if infected with COVID-19 (IATA, 2020). The airline industry is encouraging governments to adapt effective measures for passenger demand so that tourism and air travel activity can 'bounce back'. Screening passengers before departure, covid testing options and making it easy for passengers to rebook their tickets if infected (or showing symptoms) are ways of minimizing risks and allowing passengers to travel responsibly once boarders are open (Juniac, 2021).

EXTRA MEASURES TAKEN

Undertaking a survey was a quick effective, efficient and trustful way for IATA to ask a large number of passengers their opinion and get insight on their future intentions regarding travelling by air. Analysing the findings and quickly adapting to the new reality, airlines as well as airports from last year have added mandatory temperature checks and rapid COVID-19 testing as extra precaution measures (Khatib et al., 2020). Improving ventilation at airports, adapting to social-distancing boarding and disembarking strategies as well as continuous checks on aircraft disinfecting procedures are just some of the changes the aviation industry has already experienced (IATA, 2021).

NEGATIVE STIGMA

Air travel has been severely reduced during the COVID-19 pandemic as people fear becoming ill, transmitting the virus to their families, co-workers and friends, which might harm them irreversibly as well as feeling insecure about their jobs and the general economic situation but also because air travel has been curtailed by governments. In general, infectious diseases have been linked with a negative stigma due to the unknown fear they cause to individuals. The negative stigma imposed by COVID-19 occurs from sometimes accurate other times misleading information, fear of the unknown, insecurity, lack of effective treatments and governmental dysfunction (Mahmud and Islam, 2020). All of this negativity can affect passengers decisions regarding travelling. Additionally, companies and employers change the rules that employees need to follow, and families and friends might avoid individuals who travelled due to the high risk of getting infected with COVID-19 and transmitting it.

Factors such as fear, catching COVID-19 on air and reduced happiness to travel are all affecting passengers desire to travel (Lamb et al., 2020). Even though the virus

was originally spread through travel, many claim boarding an aircraft involves less risk than entering buildings, supermarkets and other types of closed office spaces (Livingston, 2020).

SOCIAL INCLUSION

Usually, air travel demand is affected by people's income and demand price elasticities (Gillen at al., 2007). For countries with higher economic activity, higher incomes means that individuals have more money to spend on leisure travel (Gillen at al., 2007). The increase in air travel demand leads to high competition between airlines concluding in price drops and more and more households having the ability to travel by air (Gillen at al., 2007). There are as well destinations where their weak economy also contributes to high air travel expansion (Gillen at al., 2007). Developing countries with balanced economic growth have given access to middle class in increasing air travel to various worldwide destinations (Pezzini, 2012). This process of social inclusion led to continuous growth of the middle class with numbers increasing to 1,2 billion from 1990 to 2005 (Ernst & Young, 2013).

A study conducted in Brazil concludes that markets which benefited from social inclusion were the most vulnerable during the COVID-19 crisis and saw a greater drop in air travel demand (Santos, Oliveira and Algrighi, 2021). As our study's sample is global, we are hoping to get a better understanding on whether this drop will continue or if it will come to an end in the future. With economies around the world struggling due to the COVID-19 pandemic, and individuals feeling fear and anxiety regarding air travel (Lamb et al., 2020). our study will investigate the differences between the types of passengers willing to travel.

VACCINATION ROLLOUT

While the aviation industry was hoping the vaccination roll out would positively affect air travel demand (IATA, 2020), the continuous rise in confirmed COVID-19 cases with new and more infectious variants such as the ones confirmed in the UK

and South Africa spreading across the world (WHO, 2021), has triggered even more fear as infection rates keep rising (Mercer, 2021). It can be reported that while infection rates are still high, death rates are reducing (WHO,2021). The global economy is expected to remain depressed with International Monetary Fund (IMF) stressing risks such as global growth, continuous rise on countries debts and cash shortages of firms to increase significantly if further lockdowns are imposed and the virus continues to spread around the world (IMF, 2021).

This situation leaves air travel demand waiting, with Flightradar24 identifying a small recovery in commercial traffic in August 2020 and December 2020 due to holiday travel (Flightradar24, 2021). Song and Choi in their research study in 2020 indicated that the development of a vaccine and the decrease of new Covid-19 cases will positively impact the demand for air travel to increase (Song and Choi, 2020). This research suggests that as the vaccine has been developed and is already distributed around the world and government restrictions have decreased, we should see quick passenger traffic growth as demand for travelling should grow abruptly.

EUROPEAN DIGITAL COVID CERTIFICATE

European countries have started to ease restrictions and following the vaccination roll out European states are trying to restore domestic and international air travel (IATA, 2021). For the benefit of individuals, businesses, and economies the EU Digital COVID Certificate has been implemented and is running effectively from 1st of July (IATA, 2021). Even though Europe would ideally follow harmonized measures, governments lack of coordination has led to some countries reopening their boarders and allowing non-essential travel while others have taken longer to relax measures.

Following the EU Digital COVID Certificate roll-out, governments around the world are urged to integrate digital certificates such as the IATA Travel Pass in passengers applications making air travel easier for passengers but also for airports and border control processing (IATA, 2021). Developing an effective and efficient global plan to manage the COVID-19 risks without forcing passengers with quarantine measures

and constant expensive PCR testing could restore passengers trust and increase air travel demand (Juniac, 2021). Our study will investigate passengers' willingness to travel in the near future now that the EU digital covid certificate is implemented.

2.4 - TYPES OF TRAVELLERS AFFECTED BY COVID-19

FEELINGS AND FEARS OF PASSENGERS DUE TO COVID-19

Zhang, Yang and others conducted a study in 2021 using passenger data from TravelSky analysing the impact of the virus in the aviation industry of China. They concluded that domestic control of the virus leads to faster recovery in passenger numbers, passengers travel confidence will require a long time to recover leading to bookings being confirmed not earlier than 15 days before departure and demand on air travel in the age groups of children, middle aged individuals and elderly people are still reduced (Zhang, Yang et al., 2021).

In a study conducted on frequent travellers' feelings and emotions regarding air travel, conclusions were that trust is one of the primary causes of fear and negativity regarding air travel (Lamb et al., 2021). Passengers feel threatened by other passengers potentially carrying the virus as well as not complying with the social-distancing measures imposed on-board. Trust issues evolve even around the safety of airlines due to staff-shortages and cost cutting. Following a quantitative and after that a qualitative study Lamb et al. agreed that factors such as fear, anxiety, vulnerability, and trust issues make individuals feel powerless in the face of the virus, having no control over it (Lamb et al., 2021).

Most passengers were optimistic though about resuming travel in future when circumstances allow them to do so. There were more mixed feelings regarding the resumption of business travel with most agreeing leisure travel will return to normal much more quickly. Another important finding was that passengers feel more secure when they have extra information regarding their flight. Feeling in control of the situation helps improve trust in airports and airlines. They were hopeful their analysis

in between business and leisure travel on 632 participants in the United States could lead to adjustments and restructuring of business travel after the crisis (Lamb et al., 2021).

GENDER AFFECTING AIR TRAVEL DEMAND

When risk perception is understood, individuals can develop effective strategies to manage risk and take precautionary measures (Rana et al., 2020). Studies have shown that risk is perceived differently depending on people's gender, with an understanding of risk by each gender contributing to how individuals are influenced (Gustafson, 1998). Individuals with higher awareness of risk act more quickly and adopt better coping measures (Sullivan-Wiley, 2017). Research on how different genders are influenced by COVID-19 pandemic risk, and their differences in coping mechanisms has been studied confirming gender differences in fear and trust risk perception (Rana et al., 2021). Men and women cope differently with the COVID-19 pandemic, with women having a better understanding of the risk involved and being more active in taking preventive measures (Rana et al., 2021). No research was identified analysing how the COVID-19 pandemic is affecting passengers' behaviour by gender with respect to air travel, a theory that will be explored in our study.

2.5 - CONCLUSION

This literature review has highlighted studies and recent research identifying a big shift in global air travel demand and passenger behaviour due to COVID-19, giving rise to a wide area of study open for research in order to identify passengers travel intentions as influenced by the COVID-19 pandemic. The management of the spread of the virus due to government restrictions, the vaccination rollout as well as the reduction in new confirmed cases globally are all factors affecting such passenger decisions.

Travelling abroad following the COVID-19 pandemic is affected by self-isolation restrictions upon arrival at the destination, hygiene conditions imposed along a passenger's travel route from the transportation used to get to the airport, the airport circumstances, the aircraft conditions, the type of disinfection measures taken as well as the social perception regarding travelling. All the above factors affect the decisions of different passenger groups and will be synthesized and researched on our study. As no literature was identified on passengers with different education levels, age and marital status our study will investigate if these different groups of passengers react differently regarding air travel in the post COVID-19 world.

CHAPTER 3. RESEARCH AIMS AND OBJECTIVES

3.0 - AIM OF THE RESEARCH

It is still not known when COVID-19 restrictions will ease and when the pandemic stage of the crisis will be concluded. The aviation industry therefore needs to focus on changes that will provide sterile solutions and safer airport environments for all passengers (Choi et al., 2021). From when the pandemic hit, frequent travellers no longer consider flying an exciting and enjoyable experience (Forsyth et al., Salari et al., 2020) leading to concerns about the general future of the travel industry (Sharma and Nicolau, 2020, Bauer et al., 2020, Tanriverdi et al., 2020, Tuchen et al., 2020). Passengers appear concerned, anxious and scared of being in close contact with other individuals at airports and on-board aircrafts (Lamb et al., 2020). But do these theories apply to all types of passengers or to specific sub-groups of passengers?

The global aviation industry has been dramatically affected by the pandemic with plethora of research understanding the impact of COVID-19 on the global aviation industry. Future research will need to be conducted to identify strategies for the airline industry to make passengers feel safer and help them proceed with travel plans (Akbar and Kisilowksi, 2020, Bauer et al., 2020, Lamb et al., Serrano and Kazda, 2020, Kao et al., 2020, Naboush et al., 2020, Shultz et al., Tanriverdi et al., 2020). Being able to explain and predict passenger behaviour regarding how passengers feel, what they think and for what reasons different types of passengers select air travel will help the aviation industry improve its market strategies, meeting passenger requirements and offering long-term profitability (Boksberger,2011).

3.1 - GAPS IN LITERATURE

A gap in academic research was identified regarding research investigating the behavioural changes of different groups of passengers due to the ongoing COVID-19 situation. This study will play a critical role in monitoring how the COVID-19 pandemic

has affected different groups of passengers' behaviour leading to the development of appropriate air travel recovery strategies from the aviation industry. Airlines depend on passenger demand forecasts to gain a better understanding of potential travel behaviours and expected passenger numbers and types. Having a better understanding of which type of passengers intend to travel by air, which are not considering travelling and which factors affect their decisions, could help the airline industry in identifying new needs, creating new strategies and policies and attracting more travellers. Predicted future demand is inevitably associated with each airlines success as many decisions are needed. These include aircraft orders, correct fleet utilization and adjusting pricing strategies and fares according to future demand and passenger types (BCG, 2006; Grosche et al., 2007; Lyneis, 2010).

Since the COVID-19 pandemic outbreak, limited studies have analysed how the pandemic will affect different groups of passengers' air travel behaviour. Song and Choi from the Department of Aviation in South Korea identified a gap in academic research in 2020 regarding studies analysing changes in behaviour in relation to infectious diseases (Song and Choi,2020). Their study surveyed how South Korean citizen's behaviour towards air travel will change considering COVID-19. The study identified the destination of travel, self-isolation requirements, level of disinfection measures, the general social atmosphere regarding travelling and the level of aircraft and airport management as key factors influencing passengers' decision to travel (Song and Choi, 2020). They concluded that even if a Covid-19 vaccine was not developed but the conditions of the above stated factors were satisfying, air travel would resume and increase. Their research was the primary study on which our research was based on and seeks to build upon.

3.2 - RESEARCH QUESTION AND HYPOTHESIS

The primary objective of this research will be to identify changes in customer behaviour regarding air transport in the post COVID-19 world. The paper will thoroughly analyse the direct and subsequent effects of COVID-19 on different

groups of passengers, identifying different behaviours and decisions tested on the same factors mentioned above.

Our ***Research Question*** will investigate

How is the behaviour of different passenger groups transitioning in the post COVID-19 era, regarding air travel?

1. Providing insightful information to the aviation industry in identifying behavioural changes and the circumstances that influence passengers in deciding to travel by air.
2. Understanding the effect of social atmosphere on individuals regarding overseas travel and the evolving needs of passengers regarding aircraft and airport management will support the airline industry as well as the travel industry in enhancing air travel demand.

Consumers holidays influence their quality of life (Dolcinar et al., 2013), with air travel being linked to a 10% of the population having a psychological reliance on travelling, considering holidays of high importance for their wellbeing and categorising them as crisis-proof (Davison, Littleford and Ryley, 2014). For as long as COVID-19 remains a health risk, consumer confidence will exist, at varying levels. Even when government restrictions are completely lifted travellers will need to face and overcome health concerns, fear and lower levels of household income, all of which inevitably affect air travel demand (Suau-Sanchez et al., 2020). These factors might affect individuals of different gender, age, education level and marital status differently depending on their way of living, responsibilities and reason for travel.

This research will explore the circumstances in which passengers are considering travelling abroad after COVID-19, and the correlation between gender, educational level, marital status and group of age in terms of affecting their decisions. Results from previous studies confirm changes in behaviour and decision-making regarding air travel due to COVID-19. However, no emphasis has been placed on the different demographic groups affected.

Our ***Hypothesis*** *assumes there will be no differences between passengers in various demographic groups (gender, educational level, marital status or age group) and their decisions regarding the factors affecting them in resuming air travel.*

Our research will also investigate how the recent vaccine rollout has affected passenger decision to travel by air. Song and Choi's 2020 study indicated that the fall of confirmed COVID-19 cases will positively affect the recovery of air travel even before the development of any type of cure or vaccine (Song and Choi, 2020). One year later, following the global vaccine rollout, our research will identify how the ongoing situation is affecting air travel demand in the near future.

CHAPTER 4. RESEARCH METHODOLOGY

4.0 - INTRODUCTION

Identifying the appropriate method for collecting data and ensuring the interpretation of the data on every research study is established on a logical framework, validates the assurance and certainty of confident and truthful results (Ghauri, Gronhaug and Strange, 2020). This chapter outlines the research methodology used with respect to data gathering, together with the methodological approach selected. The way in which the COVID-19 pandemic has affected the different passenger groups behaviour is also studied, and demand regarding air travel will be analysed.

The analysis of reliable and accurate data to reach specific results is a process used in research methodology that allows the study and the researcher to test hypotheses and answer research questions (Kumar and Phrommathed, 2005). The focus of this chapter will include analysing the research methodology used as described above, the data collection methods selected and performed, the sampling methods, together with recognition of any ethical considerations, errors and limitations of the research.

4.1 - RESEARCH APPROACH

Research methodology involves collecting information and data for the purpose of achieving results, while using all available information to answer a research question (Kumar and Phrommathed, 2005). Determining if the specific research requires a qualitative or quantitative approach is defined by the needs of the research question and the type of information required. Once the type of information required is defined, the research design can be adopted and developed. Primary and secondary data can be specified, and data collection methods can be explored and decided upon.

Qualitative analysis focuses on collection of non numerical data using techniques such as research interviews (Saunders et al., 2009). The inductive approach between theory and research highlights the importance of generating theories by interpreting individual's perceptions of the social world and reality. Quantitative analysis is a research strategy emphasizing collection of numerical data and application of different types of graphs and statistics when generating and analysing numerical information (Saunders et al., 2009).

For years, a theoretical framework approach has been used in creating hypotheses and analysing them according to data collected as empirical evidence (Collis and Hussey, 2009;, Fisher,2007). Based on the above description our study, having analysed literature from previous studies, followed a research strategy selected to provide the most practical methodology for reaching reliable results and answers to our research question and hypothesis. This study consists of a quantitative research approach, which identified a range of variables to calculate, assess and statistically present the behavioural differences between demographic groups.

4.2 - DATA COLLECTION METHOD

This study initially reviewed and analysed literature relevant to customer's behaviour regarding air travel before the pandemic as well as the continuous changes on behaviour during the ongoing COVID-19 situation. This enabled the research to identify constant changes in customer behaviours and perceptions regarding air travel as well as addressing a gap in academic research with respect to how the COVID-19 pandemic will influence different groups of air travellers when resuming travel in the post COVID world.

For the research to be efficient and satisfactory, a variety of primary and secondary data collection methods were required. Primary data were collected through a questionnaire, selected for individuals around the world, to identify accurate and reliable information on passenger behaviour and demand regarding air transport. Secondary data consists of information already collected by other authors for

different purposes (Kotler and Armstrong, 2004). Secondary data relied on collection of trustworthy data from previous research results and quality output from previous literature, which will assist in analysing the topic in depth. Such data were collected from through articles, journals, online sources, recent studies and surveys offering insight from larger sample sizes that this research did not have the time and resources to collect as primary data.

In summary, this research study and subsequent analysis was based on a questionnaire as stated, and this was the primary source used to gather essential information for the purposes of this research. The questionnaire was designed in a manner allowing for collection of responses required for the research to achieve a solid and accurate conclusion. Questionnaire distribution was achieved online as a wider audience was approached and replies were received from different parts of the world.

4.3 - THE QUESTIONNAIRE DESIGN

A questionnaire is given to survey participants to collect feedback on a specific topic through a set of selected questions which usually offer multiple choices as answers (Brace, 2008). It is considered a favoured method of data collection for testing different hypothesis and establishing theories (Brace, 2008). Self-completion questionnaires are answered without a need of an interviewer (Saunders et al., 2012), It has however been observed that participants responses are not always carefully or truthfully answered due to high demand volumes of research conducted and the need for participation (Samuel and Chipunza, 2009).

The self-completion questionnaire used for our research was designed using an online software platform (surveymonkey.com). All necessary questions to collect the required information to answer the research question were included, using a five-part scale for answers. This survey structure was based on a survey designed by Ki-han Song and Solsaem Choi from the Department of Aviation at Korea Transport Institute in 2020 who researched the behavioural changes of passengers regarding

air transport after COVID-19 in Korea. The survey was divided in sections and each group of questions helped the researchers gather data and measure different behaviours and opinions regarding resuming air travel in the post COVID world as well as the differences in demographics. Our research approach, based on their study, will identify the behavioural differences between the different demographic groups on a global level.

In total the questionnaire included 47 questions, separated into groups covering different topics investigating the recovery of air transportation after COVID-19 according to individuals' intention to travel abroad. The first group of questions were related to how COVID-19 and the current circumstances affect individuals with respect to travelling abroad. The second group of questions identified how self-isolation restrictions upon entry at destination affected passengers' decisions to travel abroad, the third group of questions identified how the hygiene conditions at the country of destination affect the decision to travel, while the fourth group of questions analysed how the social perception associated with COVID-19 affects people's behaviour regarding air travel. Finally, the level of management of COVID-19 at airports and on aircraft were analysed to identify how these circumstances and arrangements affect passenger travel choices.

4.4 - SAMPLING TECHNIQUE

Sampling comprises selection of a portion of the population which will be selected randomly to estimate behavioural characteristics that apply for the whole population (Collis and Hussey, 2009; Fisher, 2007). Questionnaires as well as sampling are reliable quantitative research methodologies which generate findings representing the whole population (Saunders et al., 2012). Sampling techniques include probability and non-probability sampling.

Questionnaire design and sampling strategy is a reliable quantitative research method of collecting large amount of data in a systematic manner, to analyse them numerically and generate findings representing the whole population (Saunders et

al., 2012). The approach used in collecting data for this research was non-probability sampling, which allows the researcher to select samples through different techniques based on subjective judgement (Saunders et al., 2012). Non-probability sampling includes different approaches such as snowball sampling, quota sampling, purposive sampling as well as self-selection or convenience sampling (Collis and Hussey et al., 2009).

This research, with an objective of collecting a reliable voluntary sample, used self-selection sampling, convenient sampling and snowball sampling. Self-selection sampling occurs when individuals voluntarily take part in a research study, while convenience sampling includes collecting primary data from individuals that are approachable by the researcher (Saunders et al., 2009). Self-selection sampling was promoted as the questionnaire was posted online on different web pages worldwide related to travel, inviting anyone interested in the topic to participate and explaining the research scope (appendix A.). Due to time limitations and ease of access, convenient sampling was also used. Co-students, friends, family members, colleagues and other individuals known to the researcher were approached and invited to participate in the research. Finally, snowball sampling was used as I asked my contacts to forward the questionnaire to their contacts requesting voluntary participation.

4.5 - PARTICIPANTS

283 respondents agreed to take part in the research study and completed the online survey. The last six survey questions collected demographic participant information. Demographics are highly important for this research study, as comparing the results between different groups of people leads to identification of potential distinctions between them and is the topic where a gap in literature was identified, and on which our research question is based.

The participants of the study were required to indicate their gender (male or female), their age group (18-24, 25-34, 35-44, 45-54, 55-64, 65+), their level of education

(Bachelor and below, Masters or PhD), their marital status (Single, Married/In a Civil Relationship), their country of residence and their main reason for travel (Vacations, Visiting friends and family or Business).

4.6 - METHOD OF QUANTITATIVE DATA ANALYSIS

The data collected from the survey questions were quantitatively and statistically analysed, using IBM's Statistical Package for the Social Sciences (SPSS) version 28. Once the data was collected from Survey Monkey, incomplete questionnaires as well as questionnaires whose respondents had not agreed to the terms for participating in the research were excluded. The completed questionnaires were downloaded onto an Excel format file so they could easily be understood by IBM SPSS. Numerical codes were allocated to all responses, questions were grouped, and new variables were created on SPSS testing each of the group of questions with the groups of demographics trying to identify patterns.

The variables created were analysed and reliability between the group of questions was measured in a need to identify Cronbach's alpha of 0.7 or above as a level of internal consistency on the specific sample used for the study, which was confirmed. Each group of questions proposed a hypothesis and was tested to determine associations amongst the variables. Rating scales were transformed to quantifiable measures where each group was investigated to determine participants behavioural change and reaction to a set group of questions

Group:

1. The COVID-19 general situation regarding travelling abroad
2. The self-isolation restrictions imposed at the country of destination
3. The sanitary conditions at the destination country
4. The social atmosphere effect on individuals regarding travelling abroad by air
5. The level of aircraft and airport management

Each group of questions tested a different factor identified by Song and Choi's study in 2020 in having significant impact on people's intentions and behaviour with respect to resuming air travel. The individual questions included in each survey group, as mentioned above are presented in (Appendix B.)

4.7 - VALIDITY AND RELIABILITY

The importance of valid questionnaires in collecting data able to measure the examined topic, as well as creating reliable questionnaires that can confirm consistent collection of data, should be monitored and confirmed (Saunders et al., 2012). A questionnaire's measurement of validity, content validity, predictive validity as well as the construct validity are all assessments required to ensure the questions selected are appropriate for the specific study (Saunders et al., 2012). Questionnaires' internal consistency should comprise of correlation on the responses given to questions between each other by using Cronbach's alpha method (Mitchell, 1996). The ability to measure a reliable consistency while researching the responses in a group of questions should provide a minimum calculation of 0.7 or higher, indicating the level of internal consistency (Hair, Black and Anderson, 2010).

As presented on ***Table 1*** Cronbach's alpha was measured, with values above $\alpha = 0.7$ considered acceptable while values above $\alpha = 0.8$ determining a high level of internal consistency (Hair et al., 2010). In this study Cronbach's alpha reliability ranged from $\alpha = 0.743$ to $\alpha = 0.901$ confirming internal reliability throughout researched questions (McMillan and Schumacher, 2006).

Cronbach's Alpha				
GROUP 1	**GROUP 2**	**GROUP 3**	**GROUP 4**	**GROUP 5**
10 Questions	**4 Questions**	**8 Questions**	**6 Questions**	**10 Questions**
0.901	**0.743**	**0.894**	**0.825**	**0.860**

***Table 1**: Cronbach's alpha Values*

(Individual Questions presented in Appendix B.)

4.8 - KRUSKAL-WALLIS H TEST ANALYSIS

The Kruskal-Wallis H Test used for our research study is a nonparametric test which identifies statistically important differences among groups of two or more independent variables on a continuous or ordinal dependent variable. For this study all five groups of questions were measured on an ordinal five-point scale from ''Strongly agree'' to ''Strongly Disagree'' in a need to understand and measure attitudes. Each group of questions was tested through a Kruskal-Wallis H Test using Nonparametric Tests > K Independent Samples procedure to determine differences between the groups of questions related to air travel and the groups of demographics (gender, age, educational level and marital status).

For data to be analysed using a Kruskal-Wallis H Test there are specific assumptions that need to be met. Firstly, each group of questions, which is our dependent variable, should be measured on an ordinal level, which condition is satisfied as all questions included a Likert scale. Secondly, each independent variables should consist of two or more independent groups, which condition is verified as all demographic groups mentioned are appropriately categorised. Thirdly, each group analysed should include different participants, with no participant being included in more than one group. Finally, the distributions of each group of the independent

variables need to have identical shape and same variability for the Kruskal-Wallis H Test to be able to compare the medians of the dependant variables for each independent variable.

4.9 - PILOT TESTING

Before the questionnaire was distributed, the researcher carried out a pilot test to ensure that data collection was conducted efficiently and accurately. The confirmation of reliability and viability was of primary importance for this research study. The online questionnaire was sent through Survey Monkey to a small group of respondents with experience in research studies who confirmed the viability and efficiency of the survey in collecting data that would deliver reliable results.

4.10 - ETHICAL CONSIDERATION

When conducting quantitative research, it is of great importance that the researcher is completely objective and the study is not influenced by any means (Burns et al., 1993). Throughout the whole research ethical behaviour was promoted by the researcher ensuring the participants privacy, anonymity and protection. For the results of the study to be completely reliable the researcher ensured no bias regarding the selection of participants and none of their personal information was recorded or disclosed for the duration of this study. Before accessing the survey, all participants were clearly advised of the purpose of the study and agreed to participate in this academic research through answering the first question of the survey (Appendix A.). It was made clear to participants that their answers would be stored anonymously and used only for the research study and fulfilment of the researcher's dissertation.

4.11 - ERRORS AND BIAS

While conducting a research using a survey method, a sampling error can occur due to sample size, and a non-sampling error can occur due to low response rates (McNabb, 2013). It should be recorded that this study was affected by low reply rates. 422 participants entered the online platform to complete the survey but only 283 agreed to participate and completed the whole survey, giving a 67% response rate. When analysing the population, with a sample of 283 participants, sampling error should be taken into consideration as factors such as distraction while answering the survey, fatigue and even different interpretation of questions could have affected the responses.

It should also be noted that the use of non-probability sampling, with convenience sampling as one of the methods used, clearly defines the difficulty of this research in giving each individual person of the population a chance in participating in the particular study. Convenience sampling leads to limitations of generalisability (Bryman and Bell, 2007). The characteristics of the individuals who decided to participate in the study, when compared to the characteristics of the individuals who didn't participate, might also lead to response bias.

4.12 - LIMITATIONS OF THE RESEARCH

This research's limitations include the size of the sample, which is undoubtedly small for obtaining results on a global level. Also, the results are indicative of the behaviour characteristics and opinions at a specific point in time. As the COVID-19 situation is continuously shifting people's behaviour and decisions could instantly change according to the circumstances.

CHAPTER 5. RESULTS AND FINDINGS

5.0 - INTRODUCTION

The objective of this study was to investigate passengers' behaviour regarding air travel in the post COVID world while examining and comparing demographic differences. The researcher obtained and critically analysed the primary data collected from 283 participants, who voluntarily agreed to take part in this study. The questionnaire gathered enough data from the participants enabling the research to detect passengers' intentions regarding resuming air travel to post COVID levels and determine which factors have affected different customer group behaviours. This chapter will explain the demographic data collected during our study and the results found when analysing each of the group of questions in correlation with the different demographic groups. Throughout this chapter, the data collected and analysed will be reviewed and research results and findings will be presented. Analysing the direct and subsequent effects of COVID-19 on passengers' behaviour will result in identification of different behavioural changes of each demographic group regarding resuming air travel in the near future, leading to answers for our research question and hypothesis.

5.1 - DEMOGRAPHICS

GENDER

Starting our analysis from the demographics of our sample of 283 participants

- 203 were female (72%)
- 77 were male (27%)
- 3 preferred not to disclose their gender (1%)

A research which includes both genders is considered more accurate and can apply easier to the general population, even though the female participants were

more than the male which poses potential limitations. Having a representation of both genders helped the research determine differences in behaviours and opinions.

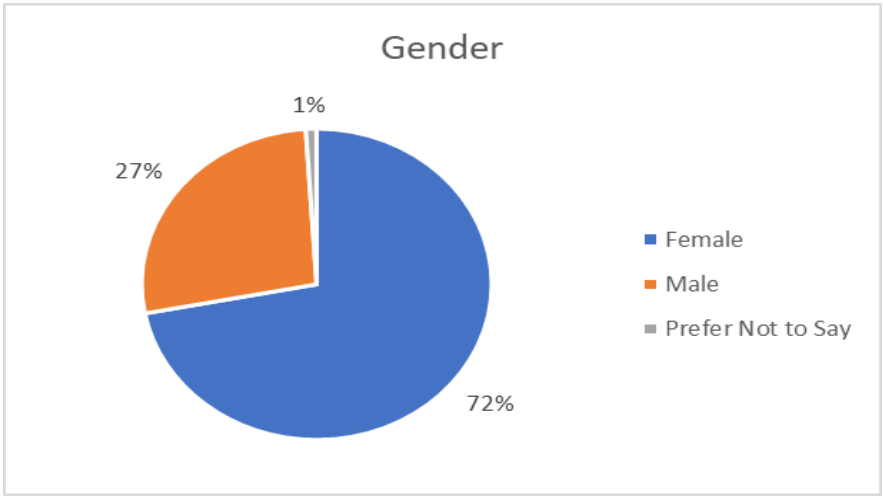

***Figure 1** : Respondents Gender*

AGE

Respecting the fact that many people are self-conscious about their age, participants needed to select their age bracket from 18-24 , 25-34, 35-44, 45-54, 55-64 and 65+. After analysis of age groups, a significant spread was observed and will be presented further on between the age groups

- 18 to 34 years old comprising of 112 participants (40%).
- 35 to 65 plus years old including 171 participants (60%).

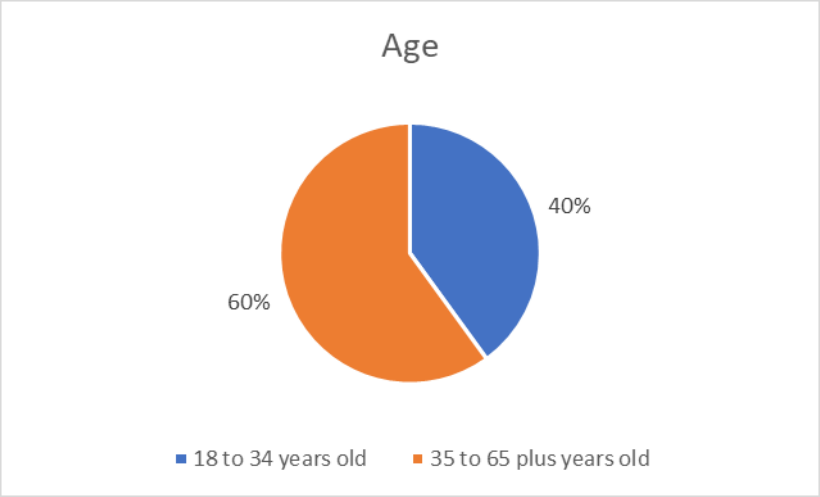

Figure 2 *: Respondents Age Groups*

LEVEL OF EDUCATION

With respect to respondent's educational level, it was identified that:

- 149 respondents (53%) had a Bachelor degree or below and
- 133 respondents (47%) were holders of Masters or PhD degree

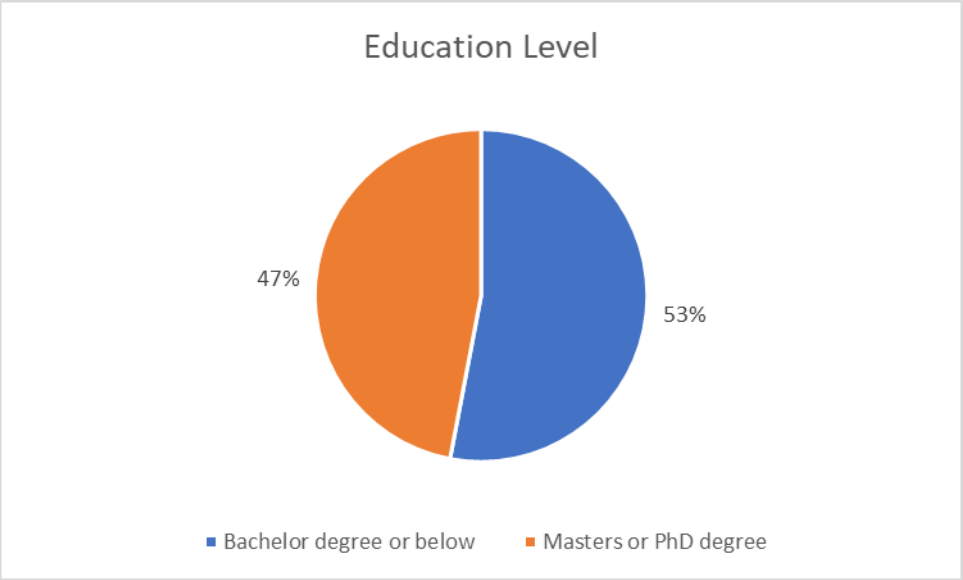

Figure 3 *: Respondents Level of Education*

MARITAL STATUS

In relation to marital status

- 115 respondents (41%) were single
- 151 respondents (53%) were married or in a civil relationship and
- 16 respondents (6%) preferred not to disclose their marital status

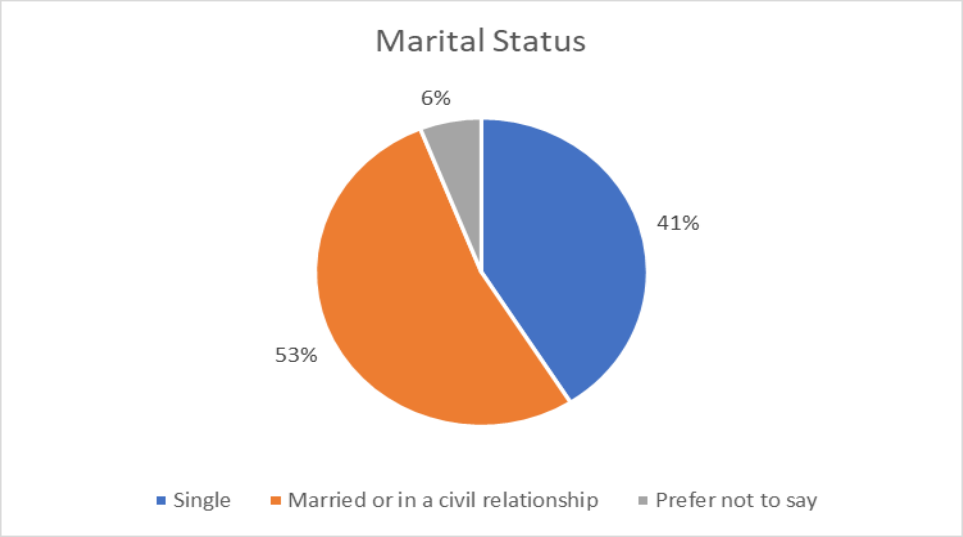

Figure 4 *: Respondents Marital Status*

5.2 - DIFFERENCES BETWEEN GROUPS OF PASSENGERS AND AIR TRAVEL DEMAND

Our ***Hypothesis,*** based on previous studies assumed that demographic differences don't affect passengers' behaviour and decisions regarding resuming air travel in the after COVID-19 world.

Using the Kruskal-Wallis H Test in SPSS to assess whether statistically significant differences are identified between the groups of questions (mentioned in appendix B.) and the various demographic groups, allowed this research to interpret the results from the test and detect findings which will be presented for each demographic group separately. Participants answered on each group of questions based on a Likert

scale from 1 showing their completely positive response to the question ''Strongly Agree'' to 5 finding them completely negative towards these questions with '' Strongly Disagree'' as a response. The results presented by the Kruskal-Wallis H Test recorded the *''Mean Rank''* for each group of questions related to factors affecting passengers in resuming air travel. The *''Mean Rank''* will be used to compare the decisions of the participants with the different demographic groups. Whether differences lie between the independent demographic groups will be identified by the *''Asymptomatic Significance'' = p* value.

The null hypothesis states that population medians are equal. Any amount of asymptomatic significance less than *p = 0.05* will show significant differences between the groups measured.

GENDER

Starting with gender and comparing results from 203 women and 77 men as per ***Table 2*** our study presents the groups of questions tested, the ''*Mean Rank*'' scores for our demographic groups of men and women, the *H* value as well as the *p* value. Since the *p* value is not less than *0.05* the null hypothesis cannot be rejected. There were no significant differences found between gender groups suggesting that men or women would make different decisions or have different behaviours regarding any of our five group of questions relating to travelling abroad after COVID-19.

Group of Questions	Related Questions-Dependant Variable	Mean Rank Men	Mean Rank Women	H	p
1	The COVID-19 general situation regarding travelling abroad	129.20	145.53	5.885	0.053
2	The self-isolation restrictions imposed at the destination country	147.90	140.66	2.125	0.346
3	The sanitary conditions at the destination country	138.44	142.19	2.907	0.234
4	The social atmosphere regarding travelling abroad by air	143.66	140.20	2.953	0.228
5	The level of aircraft and airport management	149.53	136.94	6.01	0.05

***Table 2** : Kruskal-Wallis H Test Gender Results*

Since the *p* value is not less than *0.05* the null hypothesis cannot be rejected. The test concluded that there were no significant differences found between gender groups suggesting that men or women would make different decisions or have different behaviours regarding any of our five group of questions relating to travelling abroad after COVID-19. ***Figure 5*** shows the fluctuation between the different groups of questions and the male and females Mean Rank.

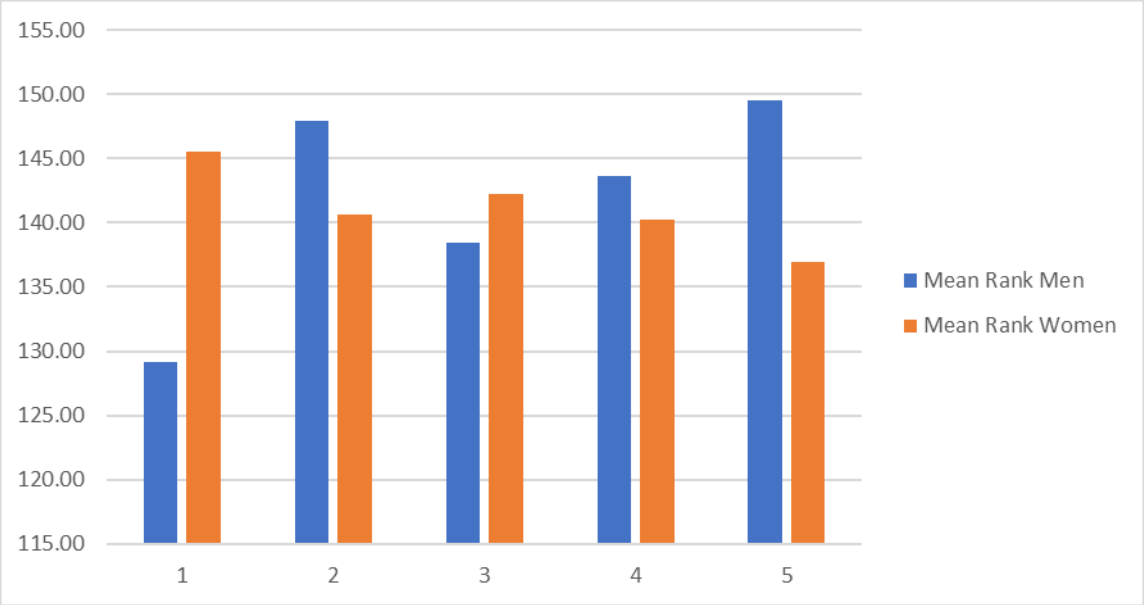

Figure 5 *: Kruskal-Wallis H Test Gender Distribution*

LEVEL OF EDUCATION

In regard to COVID-19 affecting passengers' behaviour regarding resuming air travel regardless of their educational level, as presented in ***Table 3*** the asymptomatic significance between the groups of participants was larger than *p = 0.05* confirming no significant differences between the two groups of people in different educational levels. Individuals of any level of education reacted on the same way as regards to resuming air travel in the after COVID-19 world.

Group of Questions	Related Questions-Dependant Variable	Mean Rank Bachelor and below	Mean Rank Masters and PhD	H	p
1	The COVID-19 general situation regarding travelling abroad	142.00	140.94	0.012	0.913
2	The self-isolation restrictions imposed at the destination country	136.13	147.52	1.386	0.239
3	The sanitary conditions at the destination country	136.56	147.03	1.164	0.281
4	The social atmosphere regarding travelling abroad by air	133.96	149.94	2.713	0.100
5	The level of aircraft and airport management	141.51	140.43	0.012	0.912

***Table 3** : Kruskal-Wallis H Test Level of Education Results*

In ***Figure 6*** the Mean Rank of the 149 respondents with a level of education up to a Bachelor and the 133 respondents holding a Master's or PhD degree is presented in correlation with the groups of questions.

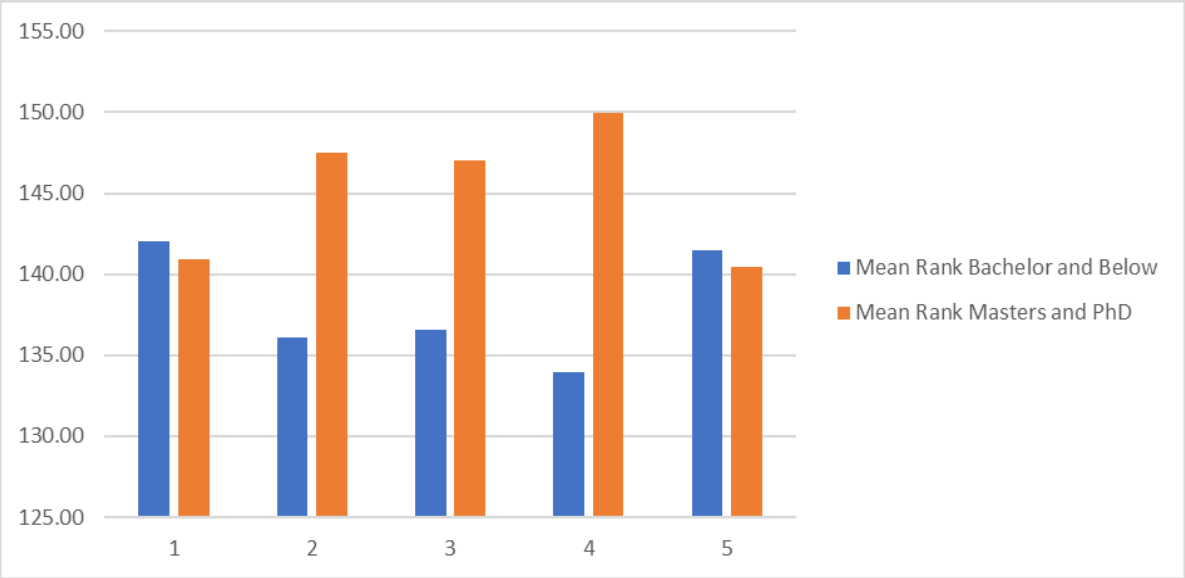

***Figure 6** : Kruskal-Wallis H Test Level of Education Distribution*

MARITAL STATUS

The Kruskal-Wallis H analysis measured passengers' mindset and approach on resuming air travel depending on their marital status. As presented on ***Table 4*** on all groups of questions, except questions on group 4 regarding how the social atmosphere affects individuals' decisions in travelling overseas, the asymptomatic

significance was smaller than $p = 0.05$ confirming statistically significant differences on how single passengers are reacting to travelling abroad after COVID-19 and how those passengers married or in a civil relationship are reacting to the same event.

Group of Questions	Related Questions-Dependant Variable	Mean Rank Single	Mean Rank Married/In a Civil	H	p
1	The COVID-19 general situation regarding travelling abroad	127.72	148.75	6.755	0.034
2	The self-isolation restrictions imposed at the destination country	123.75	152.66	9.574	0.008
3	The sanitary conditions at the destination country	126.43	149.73	7.747	0.021
4	The social atmosphere regarding travelling abroad by air	130.92	146.41	4.630	0.099
5	The level of aircraft and airport management	119.09	151.87	18.571	0.000

***Table 4** : Kruskal-Wallis H Test Marital Status Results*

The Kruskal-Wallis H Test showed statistically significant changes in behaviour and decision-making regarding air travel depending on participants marital status. As presented on ***Figure 7*** single passengers are more likely to decide to travel abroad and have similar opinions regarding self-isolation restrictions upon arrival at their destination country, sanitary conditions at the destination country and the level of aircraft and airport management, all factors affecting their decision to travel abroad.

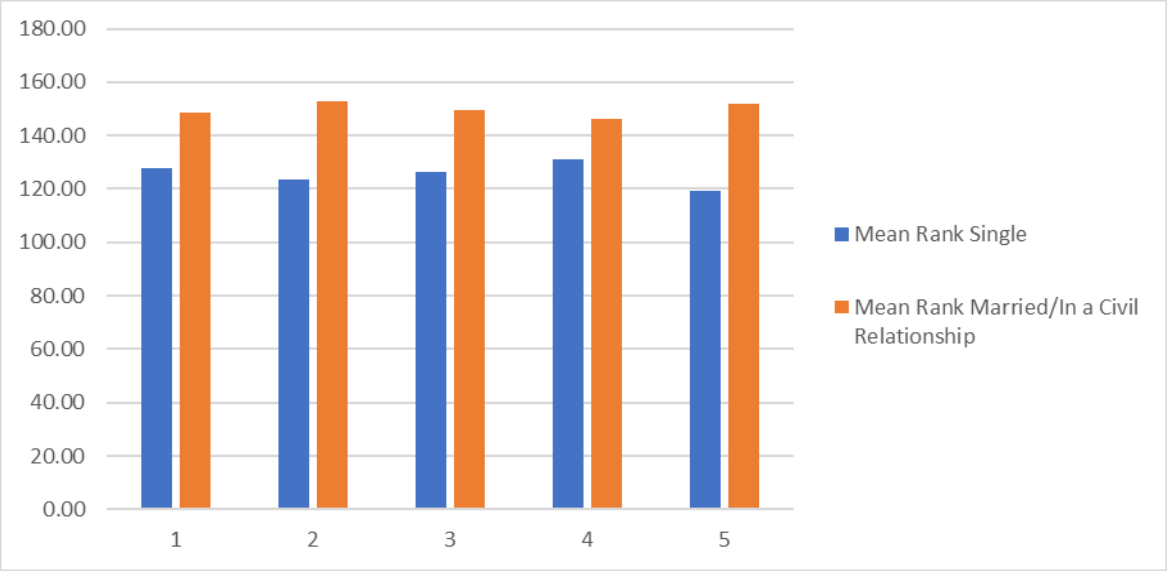

***Figure 7** : Kruskal-Wallis H Test Marital Status Distribution*

All participants though agree and have the same behaviour with respect to how social atmosphere affects their decisions regarding traveling abroad as the level of asymptomatic significance *p = 0.099* identifies no differences between the population medians.

AGE GROUPS

In the final Kruskal-Wallis H Test the participants were separated in age groups with 112 participants in the age group of 18 to 34 years old and 171 participants in the 35 years old and above group. Statistically significant differences were monitored between the age groups as presented in ***Table 5*** with asymptomatic significance of *p < 0.011* confirming statistically significant differences on all group of questions.

Group of Questions	Related Questions-Dependant Variable	Mean Rank 18-34 years old	Mean Rank 35 years old and above	H	p
1	The COVID-19 general situation regarding travelling abroad	122.16	155.00	10.941	0.001
2	The self-isolation restrictions imposed at the destination country	123.27	154.27	9.816	0.002
3	The sanitary conditions at the destination country	120.43	156.13	12.931	0.000
4	The social atmosphere regarding travelling abroad by air	126.68	152.03	6.527	0.011
5	The level of aircraft and airport management	117.81	157.11	15.710	0.000

***Table 5** : Kruskal-Wallis H Test Age Groups*

What can be assumed from the above test results presented on ***Table 5*** is that individuals aged between 18 and 34 years old are more likely to travel abroad than other age groups. From the *Mean Rank* differences depicted on ***Figure 8*** factors such as self-isolation restrictions, sanitary conditions, social atmosphere regarding air travel as well as aircraft and airport circumstances all affect their decision to travel but show they are open to travel in the near future.

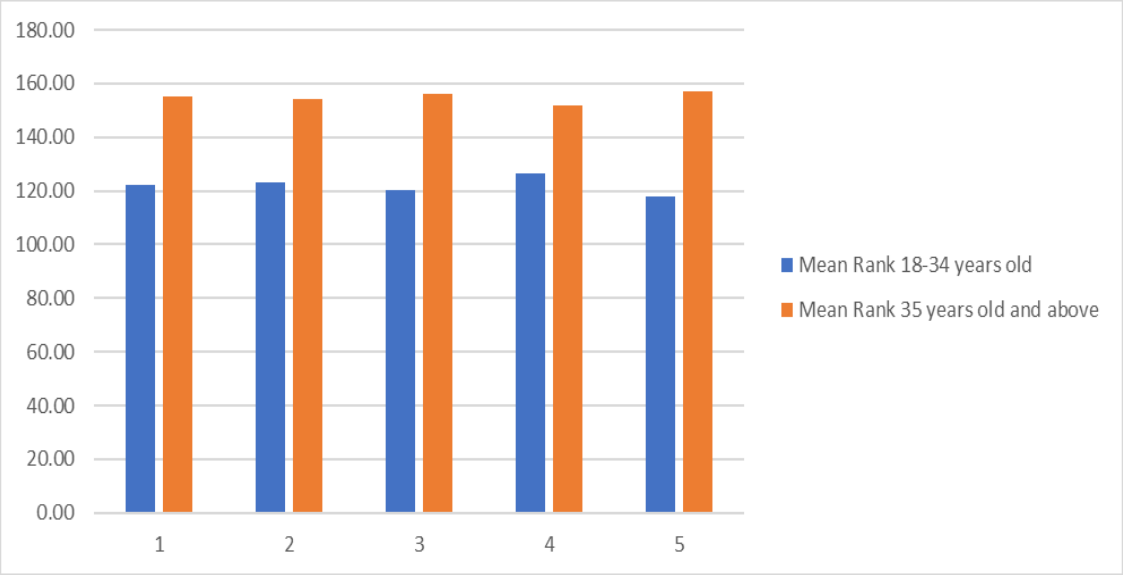

***Figure 8** : Kruskal-Wallis H Test Age Groups Distribution*

5.3 - EXPLORATORY DATA ANALYSIS

Using the responses collected from our questionnaire our research study conducted an exploratory data analysis based on previous study results. As stated by Song and Choi in 2020 after their similar study on the same factors affecting air travel demand, they expected positive passenger behaviour regarding a resumption in air travel, with demand increasing as COVID-19 cases decrease, even if a cure or vaccine is not developed. Our study took place almost one year after theirs, as the vaccine rollout contributed to government restrictions being lifted globally and passengers having the ability to travel by air if they wish. This research questionnaire included questions 40 and 41 (Appendix B) to identify passenger intentions regarding travelling in the next six months (following completion of the survey).

At this point, government restrictions are being relaxed and the pandemic seems to be more restrained, with passengers now able to undertake some travel through production of vaccine certificates and different types of negative COVID-19 test confirmations. Out of 283 participants in our study 145 (51%) confirmed that they would travel abroad 'in a month or two' while on the next question 160 of them (56%) would to travel abroad 'after six months or more'. On the same questions 78

participants (27%) confirmed they do not intend travelling in the next month or two while 47 respondents (17%) are not planning to travel abroad even in the next six months or more.

A majority of the 283 participants of our study verified that their main reason for travelling abroad is vacations and visiting friends and family, with 254 of them (89%) confirming this. Considering the approximately 4.5 billion vaccine doses administered globally by mid-August 2021 as reported by WHO (WHO, 2021), the above survey numbers suggest that many passengers do not seem to be confident in resuming air travel on pre COVID-19 levels, suggesting a benefit in further research being undertaken on the reasons passengers do not feel confident yet.

CHAPTER 6. DISCUSSION

6.0 - FINDINGS OF THIS RESEARCH

This study has researched the changing passenger behaviours and possible decisions regarding air travel in the post COVID world, in order to get a better understanding on passengers' intentions to travel in the near future. The objective of this research was to understand the impact of COVID-19 on passengers' behaviour and the type of passengers affected. The research asked 283 participants questions relating to factors affecting their behaviour and decisions in resuming air travel. General COVID-19 questions including the confirmed COVID-19 cases, the vaccination roll-out, self-isolation restrictions imposed at the country of destination, hygiene conditions at the country of destination, social atmosphere regarding travelling by air and the level of aircraft and airport management were all factors affecting air travel willingness. These factors were then compared within demographic groups such as gender, level of education, marital status, and age.

Following a Kruskal Wallis H test on the five group of questions (Appendix B.) our research reported statistically significant differences, with respect to passenger decisions, between single and married / in a civil relationship individuals as well as for groups between the age groups 18 to 34 years old and 35 years old and above, with respect to behaviours and decisions regarding resuming air travel. It can be assumed that single passengers compared to married or in a relationship passengers react differently to travelling by air and showed willingness to travel. The same factors tested affected the groups answers in different ways. The same can be stated for passengers aged 18 to 34 years old in comparison to passengers aged 35 years old and above. Our hypothesis stated that there would be no differences between different demographic groups regarding their willingness to travel. These results rejected our hypothesis allowing this study to conclude that COVID-19 has affected individuals around the world on different ways depending on their demographic differences and their willingness to travel. It should be mentioned though that there

were no significant differences with respect to gender and level of education identified opening opportunities for future studies to research further these demographic groups.

Our study then explored if the vaccination rollout and the reduced confirmed cases per country might positively affect passengers' willingness to resume air travel. Based on previous research (Song and Choi, 2020), the development of a vaccine as well as the decrease in new COVID-19 cases would affect passengers' behaviour positively leading to a rise in air travel demand. From our research it was identified that 51% of our sample is considering travelling abroad in a month or two while on another question 56% agreed that they would travel after six months or more, with 89% of them willing to travel for vacations and visiting friends and family. Even though travelling is in people's plans for the near future, confidence seems low with the number of confirmed COVID-19 cases at the country of destination, self-isolation restrictions at the country of destination, sanitary conditions, social perception regarding air travel and airline and airport circumstances consisting of factors that are highly likely to impact people's final decision in travelling by air or not.

6.1 - CRITICAL EVALUATION OF THE STUDY

As highlighted in previous literature there was a gap in research on the constantly changing passenger behaviour due to the ongoing COVID-19 pandemic. Previous studies have researched the factors influencing the level of passenger demand for air transport by analysing the effect according to population, age structure, urban agglomerations, GDP and education status. An empirical analysis resulted in above factors being confirmed as essential determinants in influencing air transport demand (Kluge et al., 2017). Research has shown demand forecast models to benefit from clustering markets where analysing characteristics in similar environments can lead to behaviour similarities regarding travel demand (Valput, 2020). As the author's research was cross sectional, the different groups of participants were compared at the same time allowing us to identify age-related differences. It should be taken into

consideration that this study sought to identify differences between groups of individuals with specific demographic characteristics, but the sample size was small for a global study, and results could be further researched. As four groups of demographics were tested, there may be different demographic characteristics in which differences in passenger behaviour could be identified and provide further results.

For this research to be efficient and acceptable primary data was collected through the tailor-made questionnaire providing truthful and accurate information on the passenger's intentions and demand regarding air travel. The research was conducted in a limited amount of time and with limited number of financial resources. This highlights the limitations of this study while this research analysed behaviours regarding air transport in the after Covid-19, it was not able to acquire samples from all countries, or the same amount of sample for each group analysed. The ongoing nature of the COVID-19 pandemic, as well as the continuous spread of the virus, should be considered as affecting the psychology of passengers with behaviours changing constantly and decisions impacted as a result. It should also be taken into consideration that government restrictions and the ability to travel freely is not consistent around the world. Our study's sample was global in nature, but each country's population is affected differently by the COVID-19 situation as their specific circumstances differ and shift unexpectedly.

6.2 - RECOMMENDATIONS FOR FUTURE RESEARCH

Studies investigating how COVID-19 has affected travel behaviour on an individual level, and which identify specific factors causing concerns, are relatively few. Zhang Jinbao and Lee Jaeyoung conducted research in 2021 which confirmed that passengers' decision to travel by air in China is undoubtedly connected with the number of confirmed COVID-19 cases (Jinbao and Jaeyoung, 2021). Their analysis compared 2019 and 2020 travel behaviour changes after COVID-19, detecting a 20.5% decrease in the use of public transports in China with air travel counting a 5.7%

(Jinbao and Jaeyoung, 2021). Using a survey and 531 participants, 380 respondents (71.56%) confirmed the necessity of reducing travel during the pandemic with females changing the number of their trips more than males (Jinbao and Jaeyoung, 2021).

Our study investigated the travel behaviour differences between men and women but nonsignificant differences were discovered regarding resuming air travel. It should be taken into consideration that their study considered intra-city travel were our study investigated long-distance travel and questionnaires were distributed after the vaccine rollout and reduction of confirmed COVID-19 globally. Further research would be interesting to investigate if passengers re act differently for inter-city travel versus long-distance travel.

Resuming air travel will not be without its challenges with respect to human behaviour, with airlines reporting from the 1st January 2021 3,000 disruptive passenger incidents out of which 2,300 incidents involved passengers refusing to wear a face mask (Koenig David, 2021). The Federal Aviation Administration (FAA) has been investigating 140 cases per year for the last decade with this year confirming approximately 400 cases by the end of May (FAA, 2021). FAA stated a ''zero-tolerance'' policy on disruptive behaviours while cabin crew and airline staff in the States advised the US Justice Department of assaults, intimidations, threats and aggressive behaviours from some passengers not willing to comply with federal law (FAA, 2021). Some say mask removal will remove tension, others fear and are anxious of travelling next to strangers during an ongoing pandemic without wearing a mask (Koenig David, 2021). Our study identified a 49% of the respondents agreeing that they would ideally travel abroad by air wearing a facemask while a 29% prefer to travel without wearing a facemask inside the aircraft. As most of the passengers are fully vaccinated at this point (a fact that did not apply when this study commenced) or can travel holding a negative COVID-19 test, we can identify a gap in research on if passengers feel safe travelling without a mask under the constantly changing circumstances and their behaviour towards this theory.

Raymond Tafrate who studies anger at Central Connecticut State University, is a psychologist and criminology professor explaining how people around the world are on edge due to the pandemic situation and even though we don't realize everyone is traumatised by the situation Tafrate, 2021). Isolation and different forms of stress have impacted people's lives with aviation psychologist Robert Bor explaining the impact COVID-19 has on people choosing to avoid enclosed spaces, being highly sensitive to keeping distances and wearing masks (Bor, 2021). All this situation causes extra anxiety to individuals with our study confirming these theories as 61% of our participants confirmed they would travel abroad if a distance of 1m or more is maintained. While conducting this study, no studies were identified researching how passengers' fears, anxiety and other forms of stress caused to them by the COVID-19 pandemic and the continuous restrictions, isolation rules and constant anxiety of getting infected by the virus are affecting individuals in continuing their life and resuming air travel as before the pandemic. This important topic should be researched further as the pandemic moves to its next phase.

6.3 - IT AND DIGITAL DEVELOPMENT

Air travel in the post COVID-19 world is continuously adapting as vaccines, therapies and herd immunity is constantly shifting. This new reality creates new challenges to the airline and travel industry with co-founder and president of Inteltravel (network of 60,000 travel advisors) James Ferrara stating that the travel industry will certainly not return to the pre-pandemic situation (Ferrara, 2021). Social distancing and continuous masking will stay, at least temporarily, while enhanced sanitary conditions as well as relaxed rebooking/cancellation policies are likely to remain for some time (Ferrara, 2021). It has also been mentioned by many studies that technology and online applications will need to be updated in the travel industry.

As identified by our research more than 50% of our survey respondents agree that aircraft status as well as airport management affect their decision regarding the circumstances they expect to face when deciding to travel by air. Safety conditions

including disinfection measures, maintenance of distances as well as spending the least possible time in airports aircrafts or commuting to and from the airport are examples of such factors. Even though airlines are financially struggling, investing in IT and digitalization achieving *'the contactless passenger journey'* could improve their customers experience making them feel safer during post pandemic travelling and eventually lead to significant returns.

Before COVID-19 the airline industry was spending approximately 5% of its revenue on IT and automation updates (Bouwer, Saxon and Wittkamp, 2021). Updating these services can help airlines achieve extra sales and support their customer relationships, which is much needed under these difficult for the airline industry circumstances (Bouwer, Saxon and Wittkamp, 2021). Check-in procedures, upgraded technologies and smartphone applications will efficiently help achieve automation and create a feeling of safety for passengers that will not need to queue as much and will avail of contactless services (Bouwer, Saxon and Wittkamp, 2021).

CHAPTER 7. CONCLUSION

The COVID-19 crisis has drastically changed transport behaviour, and this change will continue as governments and individuals constantly reassess the risks, the benefits, and the impacts on using different transport options, including air transport. As lockdowns are lifted, government policies are of critical importance to the airline industry, which needs to constantly adapt to the post lockdown period to achieve a positive effect on people's intentions regarding travelling by air. The global aviation industry has been significantly affected by the impact of COVID-19 and even though vaccinations are ongoing globally, it seems like the airline industry and COVID-19 will need to coexist for some time to come. Our study offers valuable and helpful information to airline and aviation practitioners by analysing the factors that currently affect different types of passengers and their decisions to travel by air.

By gaining an insight into thoughts, trust and fears of passengers regarding air travel and understanding different behavioural changes which were recorded, are all information which can be useful to the airline industry in managing, controlling and developing new policies and procedures as they seek to attract higher numbers of passengers. The outcomes presented from this study confirm that factors found by previous studies to affect passenger behaviour affect certain passenger types differently. Testing these factors across different demographic groups allowed this study to conclude that passengers from 18 to 34 years old will make different decisions regarding travelling by air than passengers aged 35 years old and above. The same conclusion was also reported for single passengers in comparison with passengers married or in a civil relationship. On the other hand, passengers of different gender or level of education didn't seem to react differently on the same set of questions regarding the same factors affecting air travel.

The researcher hopes that these insights can help the aviation industry understand society's needs and feed into the broader debate as to how aviation stakeholders can work towards regaining passenger trust, operating safely and achieving a return of air travel demand to pre COVID-19 levels.

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APPENDIX

LETTER TO PARTCIPANTS (Appendix A.)

Dear Participant,

Hope you're all well and safe.

If I could please ask approximately 5 minutes of your time to complete a survey for my dissertation regarding the Air travel demand after Covid-19. I am completing my MSc in Management at NCI and your participation will be greatly appreciated.

Survey responses will be anonymous and will be used for academic purposes only.

Thank you so much for your time.

Kind Regards,

Despoina Stratelou

Survey First Question Requiring Consent

1. The purpose of this study is to identify how people's travel intentions and future travel plans have been affected by the COVID-19 pandemic. Please be advised by agreeing to participate in our survey your answers will be confidential and will be used for academic purposes only.

GROUP OF QUESTIONS INCLUDED IN SURVEY (Appendix B.)

Group 1

Question 2 to Question 11

were general questions identifying if individuals would travel abroad under the current COVID-19 situation.

2	I would travel abroad now that a COVID-19 vaccine is developed.
3	I would travel abroad if a cure for COVID-19 is developed.
4	If the number of new confirmed COVID-19 cases in my destinationcountry is declining, I would travel abroad.
5	I would travel abroad if the number of new confirmed COVID-19cases per day falls below 100 in my destination country.
6	I would travel abroad if the number of new confirmed COVID-19cases per day falls below 50 in my destination country.
7	I would travel abroad if the number of new confirmed COVID-19cases per day falls below 10 in my destination country.
8	I would travel abroad if COVID-19 does not begin to spread again inmy destination country.
9	I would travel abroad if my destination country declares itselfCOVID-19-free (zero new confirmed case).
10	I would travel abroad if my destination country does not impose entryrestrictions.
11	I will definitely travel abroad if the circumstances allow me to do so,regardless of the COVID-19 situation.

Group 2

Question 12 to Question 15

were identifying how individuals are reacting to self-isolation restrictions at the country of destination due to the COVID-19 situation.

12	I would travel abroad if there were no entry restrictions,even if I have to self-isolate (currently 14 days) uponarrival.
13	I would travel abroad if the self-isolation period wasreduced to 1 week or less upon arrival.
14	I would travel abroad if self-isolation was no longer required.
15	I would definitely travel abroad if the circumstances allowme to do so, regardless of self-isolation.

Group 3

Question 16 to Question 23

were identifying how the sanitary conditions at the destination country affect peoples decision in travelling abroad.

16	I would travel abroad if the sanitary conditions of tourist attractions in my destination country were good.
17	I would travel abroad if the sanitary conditions of accommodation facilities in my destination country weregood.
18	I would travel abroad if the sanitary conditions of restaurants in my destination country were good.
19	I would travel abroad if the sanitary conditions of public transportation in my destination country were good.
20	I would travel abroad if it is convenient to use themedical facilities (hospitals and pharmacies) in my destination country.
21	I would travel abroad if my destination country has few international tourists (or if my destination country restricts the number of tourists allowed to enter per day).
22	I will definitely travel abroad if the circumstances allowme to do so, regardless of the country's condition.
23	I would travel abroad if social perception regarding overseas travel improves to a point better than it is currently.

Group 4

Question 24 to Question 29

were identifying how the social atmosphere regarding air travel affects peoples decision in travelling abroad.

24	I would travel abroad if social perception regarding overseas travel recovers to the pre-COVID-19 level.
25	I would travel abroad if social perception regarding overseas travel improves to a point better than it is currently.
26	If people around me are traveling abroad, I will also travel abroad.
27	I would travel abroad if there was no fear regarding contracting (transmitting) COVID-19 due to overseastravel.
28	I would travel abroad if the government did not restrict overseas travel.
29	I will definitely travel abroad if the circumstances allow me to do so, regardless of the perceptions of the people around me.

Group 5

Question 30 to Question 39

were identifying how the level of aircraft and airport management affects people's decision in travelling abroad.

30	I would travel abroad by air if the airline seats remain distanced from each other (1 m or more).
31	I would travel abroad by air if the sanitary conditions(provision of hand sanitizer and other disinfection measures) within the aircraft improve.
32	I would travel abroad by air if COVID-19 testing was conducted on all passengers upon departure or entry.
33	I would travel abroad by air if all airport employees and cabin crew wore face masks.
34	I would travel abroad by air if direct flights were available for me to travel to my destination.
35	Even if a layover is needed to arrive at my destination, Iwould travel abroad by air if I only have to stay inside the airport.
36	I would definitely travel abroad if the circumstances allowme to do so, regardless of the aircraft/airport circumstances.
37	I would travel abroad by air if I don't have to wear a facemask inside the aircraft (if I can breathe freely).
38	I would travel abroad by air if a distance (1 m or more) is maintained between people for check-in, security check,and boarding.
39	I would travel abroad by air if the public transportation(trains and buses) used to access the airport do not get crowded.

Question 40 to Question 41

were confirming the timeframe in which the participants are most likely to travel overseas.

40	I would travel abroad in a month or two.
41	I would travel abroad after six months or more.

Question 42 to Question 47

were collecting the demographic details of our participants.

42	What is your age?
43	What is your gender?
44	In what country do you live?
45	What is your level of education?
46	What is your marital status?
47	I travel abroad mostly for