LAURA SIEGL

UNDERSTANDING AIR PASSENGERS' MOTIVATIONS AND CONSTRAINTS FOR SUPPORTING SUSTAINABLE AIR TRAVEL

UNIVERSITY OF ALGARVE

FACULTY OF ECONOMICS

2025

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Masters in Tourism Organisations Management

Dissertation made under the supervision of:
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WORK AUTHORSHIP DECLARATION

I declare to be the author of this work, which is unique and unprecedented. Authors and works consulted are properly cited in the text and are included in the listing of references.

Laura Siegl

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Acknowledgements

The author would like to thank the Faculty of Economics at the University of Algarve for providing the institutional framework for this research. Appreciation is also extended to Cláudia Margarida Brito Ribeiro de Almeida for her formal supervision of the project. The author further wishes to express gratitude to all survey participants for their valuable contributions, and to her mother and Eden Biton for their assistance with proofreading.

Abstract

This work addresses the problem of achieving sustainable development in the aviation sector within the context of tourism. It combines a systematic literature review and a quantitative empirical study to provide a comprehensive analysis of the field. The review follows PRISMA 2020 guidelines and includes 48 peer-reviewed publications from 2011 to 2024, selected from Scopus, Web of Science, B-On, and Google Scholar. Eligible sources met strict quality, relevance, and methodological criteria and were assessed using a CASP-based checklist. The results allow for a characterisation of current research trends, highlighting a post-2020 shift toward optimisation models, value-based communication, and climate equity, alongside earlier work focused on behavioural factors. Despite growing academic attention, a gap remains between scholarly insight and practical application.

Building on these findings, the empirical investigation analysed 432 air passenger survey responses using descriptive statistics, inferential analysis, Structural Equation Modelling (SEM), and cluster analysis. The study examined motivations and constraints influencing support for and willingness to pay for sustainable flights. Environmental concerns such as carbon reduction and intergenerational responsibility emerged as strong motivators, while cost, lack of awareness, and booking complexity posed significant barriers. SEM results show that sustainability awareness mediates the relationship between motivation, constraint, travel regularity, and willingness to pay. Frequent flyers, although more aware, showed lower spending inclination, suggesting cognitive dissonance. Demographic factors such as age and income had some influence, gender differences were not significant.

Evidence from the study shows that the problems surrounding sustainable aviation require both behavioural and systemic solutions. The insights gained led to the presentation of interdisciplinary recommendations, emphasising targeted policy strategies, better communication, and non-price incentives to align consumer behaviour with climate goals.

Keywords: sustainable aviation, PRISMA 2020, air passenger behaviour, willingness to pay, environmental awareness, tourism

Resumo

Este trabalho analisa de forma aprofundada a questão da sustentabilidade na aviação, com particular ênfase no seu papel no setor do turismo. A aviação comercial constitui uma das atividades com maior intensidade carbónica, sendo que o turismo internacional depende, em larga medida, da conectividade aérea para garantir a mobilidade dos fluxos turísticos. Neste contexto, a promoção de um modelo de aviação mais sustentável revela-se essencial para a prossecução dos objetivos de desenvolvimento sustentável e para a mitigação dos impactos ambientais associados à mobilidade global.

Com o propósito de aprofundar a problemática em análise, a presente investigação recorre a uma abordagem metodológica mista, articulando uma revisão sistemática da literatura com um estudo empírico de natureza quantitativa, desenvolvido a partir da aplicação de um inquérito a passageiros. Numa primeira fase, procedeu-se à realização de uma revisão sistemática da literatura científica, seguindo as diretrizes estabelecidas pela metodologia PRISMA 2020. Foram identificadas e analisadas 48 publicações relevantes, datadas entre 2011 e 2024, selecionadas a partir das bases de dados Scopus, Web of Science, B-On e Google Scholar. Nos critérios de inclusão adotados foram incluídas as publicações redigidas em língua inglesa, com acesso ao texto integral, avaliadas positivamente de acordo com o ranking SJR, e com clara pertinência temática para a interseção entre aviação, turismo e sustentabilidade. A avaliação da qualidade metodológica das fontes foi realizada com base numa checklist adaptada da ferramenta CASP, assegurando a fiabilidade e a validade dos dados sintetizados.

A análise efetuada revelou uma evolução significativa na investigação académica relativa à aviação sustentável ao longo dos últimos anos. Os estudos iniciais, sobretudo os publicados antes de 2017, incidiam maioritariamente em abordagens comportamentais e de perceção, centrando-se em aspetos como as atitudes ambientais dos consumidores e a respetiva disposição para pagar por opções mais sustentáveis. A partir de 2020, observa-se uma intensificação da produção científica com uma crescente complexidade analítica, refletida na incorporação de modelos de otimização, abordagens sistémicas, perspetivas de justiça climática, estratégias de comunicação orientadas por valores e políticas de mitigação assentes na equidade intergeracional. Verifica-se, igualmente, uma

diversificação metodológica, com um aumento substancial do recurso a análises quantitativas, técnicas de modelação e estudos empíricos de caráter transversal.

Apesar do aumento da produção científica neste domínio, os resultados evidenciam uma lacuna persistente entre o conhecimento produzido na investigação e a sua efetiva aplicação. As companhias aéreas continuam, em grande medida, a privilegiar estratégias comunicacionais assentes em narrativas de marketing que enfatizam o luxo, a exclusividade e a aventura, deixando para segundo plano a comunicação de compromissos ambientais responsáveis. A ausência de incentivos estruturais eficazes, aliada à fraca incorporação das recomendações científicas nos processos de decisão operacional das empresas, contribui para o distanciamento entre as intenções declaradas e os comportamentos efetivos dos consumidores. Este panorama sublinha a urgência de promover uma maior colaboração interdisciplinar, bem como uma articulação mais estreita entre a academia, o setor empresarial e os decisores políticos, de modo a alinhar conhecimento, práticas e políticas com os imperativos da sustentabilidade.

Com base nos resultados obtidos na revisão sistemática, foi desenvolvido um estudo empírico com o intuito de aprofundar a compreensão dos fatores que influenciam o apoio dos passageiros a práticas de aviação sustentável. O inquérito foi realizado online entre setembro de 2024 e janeiro de 2025, tendo sido recolhidas 432 respostas válidas. A aplicação teve por base uma amostragem em bola de neve, com divulgação através de redes sociais, plataformas académicas e canais profissionais. O questionário foi estruturado em torno de cinco domínios principais: (1) motivações para apoiar a aviação sustentável, (2) barreiras percebidas, (3) frequência de viagem, (4) consciência ambiental, e (5) disposição para pagar um valor adicional por opções de voo mais ecológicas. Para além destes, foram igualmente recolhidos dados sociodemográficos, nomeadamente idade, género, nacionalidade, nível de escolaridade, situação profissional e rendimento mensal.

A análise estatística recorreu a um conjunto diversificado de técnicas, incluindo estatísticas descritivas para a caracterização da amostra, testes inferenciais (t-test, ANOVA, Kruskal-Wallis e Mann-Whitney) com vista à identificação de diferenças estatisticamente significativas entre grupos sociodemográficos, modelação por equações

estruturais (SEM) para a avaliação de relações causais entre variáveis latentes, e análise de clusters com o objetivo de segmentar perfis comportamentais. Esta combinação de abordagens permitiu uma análise robusta, aprofundada e multidimensional dos dados recolhidos.

Os resultados obtidos evidenciam que as principais motivações para o apoio à aviação sustentável se relacionam com preocupações de ordem ambiental, nomeadamente a redução da pegada de carbono, a preservação do ambiente para as gerações futuras e a melhoria da qualidade do ar. Em contrapartida, os principais obstáculos identificados prendem-se com o custo elevado dos bilhetes que são considerados sustentáveis, a escassez de informação acessível e a dificuldade em localizar e reservar essas opções nas plataformas tradicionais de reserva de viagens. A análise por modelação de equações estruturais (SEM) indicou que a consciência ambiental desempenha um papel mediador nas relações entre as motivações, as barreiras percecionadas, a frequência de viagem e a disponibilidade para pagar por alternativas mais ecológicas. Estes resultados sugerem que estratégias orientadas para o reforço do conhecimento e literacia ambiental dos consumidores poderão contribuir de forma significativa para a promoção de comportamentos mais sustentáveis no contexto da aviação.

Uma das constatações mais relevantes do estudo foi a identificação de dissonância cognitiva entre os passageiros frequentes. Apesar de evidenciarem níveis mais elevados de consciência ambiental, estes indivíduos revelam, paradoxalmente, uma menor disposição para pagar por opções de voo sustentáveis, refletindo um desalinhamento entre os valores declarados e os comportamentos efetivos. Este tipo de dissonância poderá ser explicado por mecanismos de justificação, negação e racionalização, amplamente referidos na literatura especializada. Este fenómeno representa um dos principais desafios à promoção da aviação sustentável, uma vez que os passageiros frequentes têm um impacto desproporcionado nas emissões de carbono, mas tendem a revelar menor predisposição para alterar voluntariamente os seus hábitos de mobilidade.

A análise dos dados demográficos evidenciou que variáveis como a idade, o rendimento e o nível de escolaridade influenciam de forma significativa os níveis de consciência ambiental e a disposição para pagar por alternativas sustentáveis. Os indivíduos com

níveis de escolaridade mais elevados e rendimentos superiores demonstraram maior sensibilidade ambiental, bem como um apoio mais expressivo a políticas de sustentabilidade. Em contraste, a variável género não revelou diferenças estatisticamente significativas. A análise de clusters possibilitou a segmentação da amostra em grupos distintos, com perfis comportamentais diferenciados, contribuindo para a conceção de campanhas de sensibilização mais eficazes e ajustadas às especificidades de cada público-alvo.

Com base nos dados obtidos, foram elaboradas recomendações práticas com o objetivo de fomentar uma transição efetiva para uma aviação mais sustentável. Entre as propostas mais relevantes destacam-se: (1) a implementação de incentivos não monetários, tais como selos ecológicos, mecanismos de reconhecimento social e benefícios reputacionais para passageiros e companhias; (2) o reforço da transparência nas práticas ambientais das transportadoras aéreas, através da divulgação sistemática de relatórios de emissões e da obtenção de certificações independentes; (3) a integração de opções sustentáveis nos motores de pesquisa e nas plataformas de reserva de viagens, mediante a introdução de filtros específicos e informação clara e acessível ao consumidor; e (4) o desenvolvimento de campanhas de comunicação assentes em valores, emoções e normas sociais, recorrendo a mensagens personalizadas e culturalmente sensíveis, com vista à promoção de comportamentos pró-ambientais..

Paralelamente, sublinha-se a importância do investimento em educação climática e em literacia ambiental, tanto em contextos formais como informais, como estratégia para capacitar os consumidores e promover comportamentos mais conscientes e responsáveis. As mensagens comunicacionais deverão evitar discursos assentes na culpabilização individual, privilegiando, em alternativa, apelos ao sentido de comunidade, à ética intergeracional e aos benefícios coletivos resultantes da ação sustentável. Por fim, torna-se imperativo o reforço de políticas públicas mais ambiciosas e de mecanismos regulatórios eficazes, que permitam alinhar os interesses dos consumidores, das empresas e da sociedade civil com os desafios ambientais globais e os compromissos assumidos em matéria de sustentabilidade.

O estudo reconhece algumas limitações, nomeadamente o recurso a dados autor relatados, a natureza transversal do inquérito e o potencial enviesamento decorrente da amostragem não probabilística. No entanto, os resultados obtidos fornecem uma base empírica sólida para aprofundar a compreensão das dinâmicas que moldam o comportamento dos passageiros aéreos em relação à sustentabilidade. Investigações futuras poderão explorar métodos longitudinais, análises interculturais e abordagens qualitativas para captar melhor os fatores subjetivos que influenciam decisões de consumo neste domínio.

Conclui-se que a transição para uma aviação mais sustentável no contexto do turismo não poderá ser alcançada apenas por via tecnológica ou regulatória. A mudança de comportamentos individuais, coletivos e institucionais é indispensável. Esta mudança requer uma abordagem integrada que combine inovação, governança, envolvimento cidadão e colaboração entre múltiplos atores. Este estudo contribui para esse objetivo ao oferecer recomendações práticas, evidência empírica rigorosa e uma perspetiva crítica sobre os caminhos possíveis para um turismo aéreo mais equitativo e ambientalmente responsável.

Palavras-chave: aviação sustentável, PRISMA 2020, comportamento dos passageiros aéreos, disponibilidade para pagar, consciência ambiental, turismo

GENERAL INDEX

Page

INDEX OF GRAPHICS

Page

INDEX OF TABLES

Page

ABBREVIATIONS LIST

ACA	Airport Carbon Accreditation
ANOVA	Analysis of Variance
B-On	Biblioteca do Conhecimento Online
CASP	Critical Appraisal Skills Programme
CD	Cognitive Dissonance
CERQual	Confidence in the Evidence from Reviews of Qualitative Research
CO_2	Carbon Dioxide
CORSIA	Carbon Offsetting and Reduction Scheme for International Aviation
ETS	Emissions Trading Systems
GC	Global Citation
GRADE	Grading of Recommendations Assessment, Development, and Evaluation
ICAO	International Civil Aviation Organization
LC	Local Citation
LCA	Life Cycle Assessment
ML	Maximum Likelihood
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
PtL	Power to Liquid
SAF	Sustainable Aviation Fuel
SEM	Structural Equation Modelling
SJR	SCImago Journal Rank
SLR	Systematic Literature Review
SPSS	Statistical Package for the Social Sciences
t-test	Student's t-test
WTP	Willingness to Pay
ZET	Zero Emissions Tourism

Chapter 1. INTRODUCTION

1.1 Introduction

Sustainable aviation has emerged as a pivotal concern within tourism research and practice, particularly in the context of its escalating contribution to climate change. The airline industry, which facilitates the transport of over four billion passengers annually, plays a crucial role in the world economy and the promotion of international mobility. However, it is also one of the most carbon-intensive industries (Müller, Stauch, et al., 2022; Placek, 2025). Historically, the academic and policy discourse around sustainable aviation focused heavily on technological innovation, infrastructure efficiency, and regulatory frameworks. Early work prioritised carbon output mitigation strategies through mechanisms like carbon offsetting schemes, emissions trading systems (ETS), and improvements in aircraft propulsion technologies (Bishop, 2002; International Civil Aviation Organization (ICAO), 2007).

Preliminary studies from 2014 onward began shifting attention from the supply side of aviation to the demand side in achieving sustainability. These papers examined consumer awareness, attitudes, and WTP, revealing a gap between environmental concern and actual behaviour (Cohen et al., 2014; Seetaram et al., 2018). While this was a promising development, most early behavioural research was limited in scope, often focusing on hypothetical pricing scenarios or general perceptions without conducting in-depth investigations into the psychological drivers of air passenger behaviour (Ragbir et al., 2021).

In recent years, scholars have broadened the behavioural perspective, focusing on cognitive dissonance (CD), identity-related motivations, and message framing in climate communication, a trend that has gained momentum since 2020. CD is the mental discomfort people feel when their actions conflict with their beliefs, such as acknowledging climate change but not changing their behaviour (Cocolas et al., 2023; Higham et al., 2022). These newer studies highlight the complex drivers of air travel, where values, emotions, and social norms shape behaviour as much as economic rationality. Research has also begun to explore demographic and contextual factors,

including travel frequency and sustainability awareness. Yet, findings remain fragmented, and there is little consensus on what encourages or hinders passengers from supporting green aviation (Oswald & Ernst, 2021; Zhang et al., 2022).

This dissertation is based on two academic articles prepared for journal submission. The first paper, titled *"Greening the Skies: A PRISMA 2020 Systematic Review of Sustainable Aviation in Tourism,"* has already been submitted to the Journal of Sustainable Tourism and is currently under review. The second article, *"Understanding Air Passengers' Motivations and Constraints for Supporting Sustainable Air Travel,"* will be submitted following feedback from the dissertation jury.

1.2 Definition of the Theme or Problem to Study

Aviation generates 240 billion USD in revenue, supports 90 million jobs globally (Placek, 2025), and facilitates vital human and economic connectivity. Once a luxury, air travel has become an essential commodity (Conrady et al., 2019; Müller, Stauch, et al., 2022; Müller, Walls, et al., 2022). As a result, transportation and the airline sector, in particular, are valued from a socio-economic perspective. Nonetheless, as already mentioned, this enhanced mobility has detrimental effects on the ecosystem. “As a carbon-intensive industry, aviation is a major contributor to global warming and has been the focus of the global climate strike movements and other concerned stakeholders in recent years” (Müller, Walls, et al., 2022:2). If left unaddressed, the eco-crisis will bring operational disruptions such as weather-related delays, safety concerns, and infrastructure strain. Consequently, there is an inherent motive to mitigate this environmental shift and stop hazards before they negatively impact the industry (Ryley et al., 2020).

To reduce its impact on the ongoing climate emergency and global warming, aviation, like other sectors of the global economy, must adapt its operations and technological infrastructure (Müller, Walls, et al., 2022). Thereby, remaining ahead of competitors and authorities, as well as avoiding dire repercussions from failing to address climate change, will provide those airlines that act early with a competitive and strategic advantage (Hart, 1995; Müller, Stauch, et al., 2022; Porter & Kramer, 2006).

At present, there is no agreement on a definition for sustainable aviation among scholars and industry participants. The one that fits the research purposes of this dissertation the most is the one of Waddington and Ansell (2024:1):

> "Sustainable aviation is the process of creating the air transportation system that maintains the connectivity of communities and mobility of people, goods, and services while minimizing negative impacts to human health, fostering productive quality of life, and conserving natural resources."

Despite the aforementioned growth in academic work, comprehensive literature reviews remain scarce. Furthermore, while prior research has mapped general attitudes and preferences, there is a paucity of empirical evidence examining the interplay between motivations, constraints, and passenger profiles. Moreover, the influence of travel frequency and environmental awareness on support for sustainable air travel remains underexplored, especially in a post-pandemic world where passenger values and expectations may have shifted (Amicarelli et al., 2021; Rice et al., 2020).

Therefore, the first article provides a structured analysis of the evolution of academic research in the field, identifying the dominant themes, methodological trends, and key contributors. The second paper focuses on consumer behaviour, investigating the motivations and barriers that influence support and willingness to pay for sustainable flight options. Together, these two parts aim to deepen the understanding of the factors that either advance or inhibit sustainable aviation within tourism.

1.3 Relevance of the Theme or Problem

The urgency of the climate crisis, along with evolving traveller expectations and regulatory landscapes, makes sustainable aviation a critical area of study. While technological innovations like Sustainable Aviation Fuels (SAF) and carbon offsetting have long dominated the discourse, less emphasis has been placed on behavioural dimensions, despite their centrality to demand-side transitions. Understanding how motivations, constraints, awareness, socio-demographics, and psychological factors shape perceptions toward green travel is essential for aligning public policy, industry practices, and marketing strategies (Kim & Hyun, 2021; Gössling et al., 2020; Higham et al., 2016).

Additionally, the COVID-19 pandemic disrupted global mobility and altered attitudes toward travel necessity, providing a unique opportunity to reassess behavioural patterns. This dissertation contributes to filling the gap between supply-side innovations and demand-side understanding by combining systematic academic analysis with empirical data on traveller perceptions (Amicarelli et al., 2021; Oswald & Ernst, 2021; Rice et al., 2020).

1.4 Research Questions

The overarching study was guided by two sets of research questions, corresponding to the two academic papers forming the core of this dissertation.

For Article 1 (Systematic Review):

- RQ1: How has research on sustainable aviation evolved?
- RQ2: What characterises the current academic trends in environmentally responsible air transport?
- RQ3: Which sources, articles, and authors are the most influential in this research domain?
- RQ4: What are the dominant themes in the study of eco-friendly aviation?
- RQ5: What is the future academic scope of green air travel?

For Article 2 (Empirical Study):

- RQ1: What motivations and constraints influence air passengers' inclination to support and pay more for sustainable air travel?
- RQ2: How do awareness and frequency relate to the willingness to commit to green flying financially?
- RQ3: To what extent do demographic factors shape motivations, constraints, and investment in eco-friendly aviation?

1.5 Organisation of the Study

This dissertation is organised into four main chapters. Following the introductory section, Chapter 2 presents the first article, a systematic review that maps the academic landscape of sustainable aviation research using the PRISMA 2020 framework. The section outlines the methodological approach, reports the main findings, and offers an in-depth discussion of the theoretical foundations, prevailing themes, and existing gaps in the literature.

The following section details the second paper, which draws on a quantitative empirical study based on 432 survey responses. It outlines the study design, describes the data collection process, and explains the analytical tools employed. Moreover, the findings are discussed and interpreted in light of established theoretical frameworks and previous research.

Chapter 4 concludes the dissertation by synthesising the findings from both articles. It discusses the combined implications for research, policy, and practice and provides recommendations for further investigations and industry strategies. In addition, the section reflects on methodological limitations and identifies opportunities for future research.

Chapter 2. FIRST ARTICLE

2.1 Methodology

A systematic literature review (SLR) was conducted to provide a comprehensive overview of sustainable aviation within the tourism context. PRISMA is the recognised standard for presenting evidence in SLRs and meta-analyses (Page et al., 2021). "The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement, published in 2009, was designed to help systematic reviewers transparently report why the review was done, what the authors did, and what they found" (Moher et al., 2009; Page et al., 2021:1). Due to significant methodological developments over the last 15 years, the PRISMA 2020 update replaced the original checklist, reflecting advancements in identifying, evaluating, and summarizing research (Page et al., 2021). This study, therefore, follows the PRISMA 2020 guidelines to ensure transparency, replicability, and future updatability. The executed phases are detailed below, and a completed checklist is included in Annex A.

2.1.1 Defining Eligibility Criteria

This study only considered articles that were published after 2010 and in the English language. Furthermore, publications were excluded if they were not accessible in full-text versions. Moreover, only articles, books, and conference proceedings were eligible. Thereby, the academic papers needed to be published in journals with a good SJR ranking, meaning they are recognized for issuing high-impact, reputable research that is frequently cited by other scholars. Another important criterion was the fit of the material with the study purpose. Lastly, all the publications had to pass a quality and bias assessment. The purpose of those criteria is to ensure that the selected studies are reliable, pertinent to the research objective, and reflective of the current state of the art in the domain of sustainable aviation.

2.1.2 Literature Identification, Screening, and Inclusion

To guarantee the validity and depth of this publication, the author used Scopus, Web of Science, Google Scholar, and B-On. In addition, articles from previous research were incorporated at the identification stage. All of the databases were last searched on September 13, 2024.

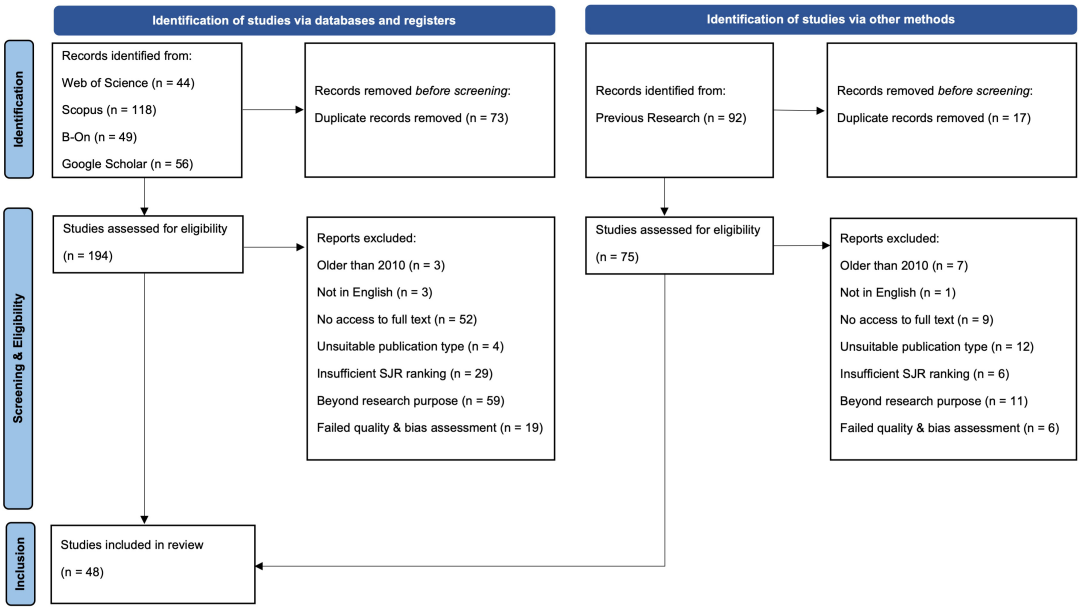
Before the screening process, a search string was developed and subsequently entered into the aforementioned databases to query titles, abstracts, and keywords. The retrieval strategy combined aviation-related sustainability with tourism-related keywords, using Boolean operators:

- **Sustainability terms:** "sustainable aviation", "green aviation", "low-carbon aviation", "environmentally friendly aviation", "carbon-neutral aviation"
- **Tourism expressions:** "touris*", "travel", "hospitality"
- **Search string:**
  ("sustainable aviation" OR "green aviation" OR "low-carbon aviation" OR "environmentally friendly aviation" OR "carbon-neutral aviation") AND ("touris" OR "travel" OR "hospitality")*

This resulted in 359 publications from all five sources.

After removing duplicates, studies were screened in two stages: titles and abstracts were evaluated against the predefined eligibility criteria, followed by full-text review, confirming thematic relevance. This two-step process, informed by prior literature and conducted across multiple reputable databases, helped mitigate selection and procedural bias. A final quality and bias assessment was conducted using an adapted CASP checklist to ensure consistency across the sample (see Annex B), resulting in a total of 48 included studies. Spanning from February 2011 to September 2024, the review period captures over a decade of research. The screening and CASP assessment were conducted manually by the author without the use of automation tools or additional reviewers. Graphic 2.1 presents a flowchart that visualises the entire PRISMA process, while Appendix A includes a table listing all the selected articles.

Graphic 2.1: PRISMA Flow Diagram of Literature Review Process



Own work adapted from: Page et al. (2021:5)

SJR = SCImago Journal Rank (citation-based journal ranking system)

2.1.3 Data Collection & Extraction

To prepare the 48 papers for the following descriptive analysis, a comprehensive data extraction spreadsheet was created. This helped with collecting key characteristics of the articles. Namely, title, authors, journal, organisations, year of publication, and sample size. Also, the regional focus of the study, as well as its type, design, and research focus, were documented. Finally, the used keywords and main outcomes of each paper were included in the spreadsheet. All relevant data were extracted as reported in each study, including descriptive findings and thematic conclusions. No assumptions were made about missing or unclear information. If outcome domains varied, the most relevant result to the research questions was selected. This data extraction template was first piloted with a few single articles, adjusted, and then used for the whole sample.

Data collection was performed manually by the author without the use of automation tools. No additional reviewers or external validation steps were involved. The process was precisely documented with the help of Excel and can be found in Appendix B.

2.1.4 Analysis & Synthesis Approach

As already mentioned, this study used a descriptive framework to examine the characteristics of the included articles. Thereby, key features of each study were systematically categorised and synthesised. Further, author, journal, and article impact were assessed using h-, g-, and m-indices, as well as local and global citation counts. To explore conceptual insights and recurring ideas, a thematic synthesis was applied. Thereby, studies were grouped into three categories during data extraction, corresponding to the main research focuses: (1) trends in sustainable aviation, (2) operationalisation of sustainability, and (3) behavioural and social aspects. This approach allows for the integration of findings across diverse study types and supports meaningful interpretation of qualitative themes, while retaining the structure necessary for a systematic review (Loeb et al., 2017; Popay et al., 2006; Thomas & Harden, 2008). The combination of descriptive and thematic synthesis was selected to enable structured comparison across papers and to provide a comprehensive overview of the literature's scope and diversity. Study data and synthesis results were organised in Tables 2.1-2.4 and visualised using descriptive charts and figures generated in Power BI (see Graphics 2.2-2.7 and Appendix C).

No statistical effect measures (e.g., risk ratios or mean differences), subgroup analyses, meta-regression, sensitivity analyses, or formal certainty assessments (e.g., GRADE or CERQual) were conducted, as the review did not include meta-analysis and was qualitative. The synthesis instead relied on descriptive and thematic approaches suited to this type of data. Moreover, no transformations or imputations were necessary, though minor formatting adjustments (e.g., separating multi-author or keyword entries) were made to support analysis in Power BI. Furthermore, the risk of bias due to missing results (e.g., from publication or reporting bias) was not formally assessed. However, efforts to reduce bias included searching multiple databases and applying broad search terms. Language bias may persist due to the inclusion of English-only studies.

2.2 Results

The initial database search yielded 359 records. After removing duplicates and applying eligibility criteria, 48 publications were included in the final synthesis. Graphic 2.1 summarises the study selection procedure using the PRISMA 2020 flow diagram. Several articles initially appeared eligible but were omitted during the screening process for specific reasons: Bows et al. (2009) was excluded due to being published before the 2010 cut-off. Conrady et al. (2019) was written in German, and Maleviti (2023) could not be accessed in full text. Moreover, Gerich (2021) presented a thesis which did not meet the source type criteria. Furthermore, Reis et al. (2017) was excluded based on an unsatisfactory SJR ranking. Hall et al. (2015) was too general in scope and lacked direct relevance to the review objectives, while Kobbaey et al. (2023) did not pass the CASP quality and bias assessment. Overall, most publications met CASP criteria for methodological clarity and relevance, though some showed weaknesses in areas such as reflexivity and transparency (25 studies). A template of the checklist is available in Annex B, and individual evaluations for each paper can be provided upon request.

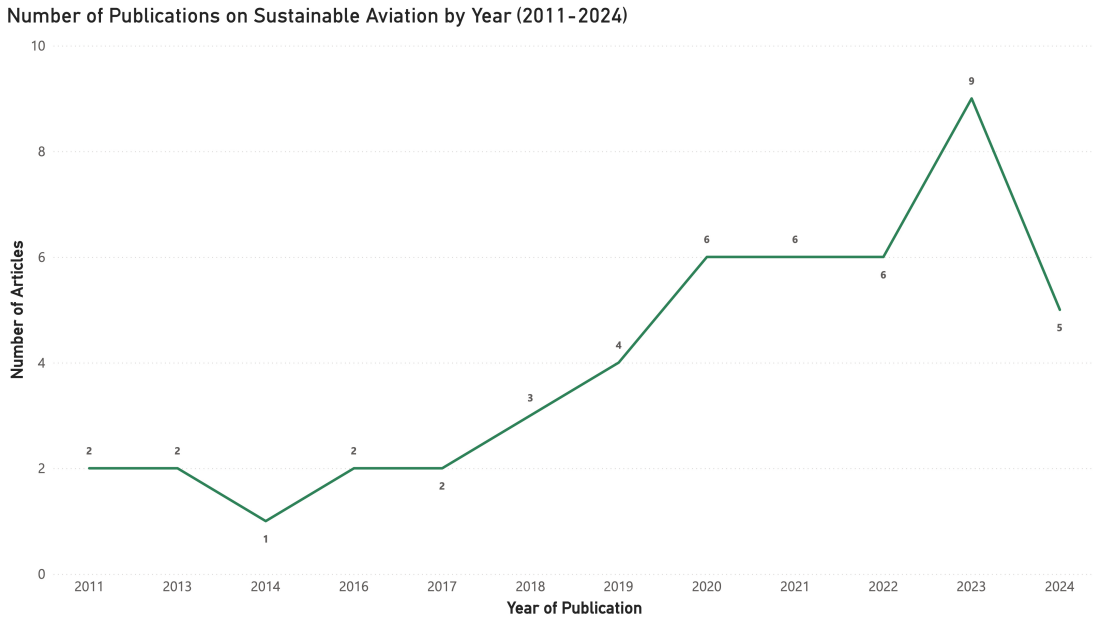
2.2.1 Descriptive Synthesis

After the full screening and eligibility assessment, the 48 studies were included in the descriptive analysis. Thereby, summary statistics were calculated, and visualisations created using Microsoft Power BI to explore publication trends, geographic focus, methodological designs, and keyword patterns, among others.

2.2.1.1 Research Frequency

Graphic 2.2 shows that while early research began around 2011, sustained scholarly attention to sustainable aviation only accelerated after 2017. The number of publications grew steadily, peaking in 2023, which reflects a growing academic and policy interest in this topic (RQ1).

Graphic 2.2: Number of Publications on Sustainable Aviation in the Dataset by Year



2.2.1.2 Impact Assessment

To evaluate the scholarly influence of the reviewed literature, an impact assessment was conducted using established bibliometric indicators of authors, journals and included

Authors

Among the scholars in the dataset, James Higham, Scott Cohen, and Stefan Gössling published the most articles, with 15, 9, and 8 papers, respectively. In terms of total citations, the most prominent authors are also those with the highest h- and g-indexes. However, considering the m-index, Stephen Rice is the most influential one, followed by Andreas Humpe and Paul Hanna, with a score of 3.0, 1.0, and 1.0, respectively. This discrepancy can likely be attributed to the limited period of their contribution to the dataset. Nonetheless, an analysis of their overall m-indices with the help of Google Scholar reveals a significant impact in their respective disciplines as well. Table 2.1 summarises the influence of authors based on h-, g-, and m-indices.

Table 2.1: Most Influential Authors in the Dataset

Name of Author	Number of Papers in the Dataset	Total Citations	H-Index	G-Index	M-Index
James Higham	15	960	10	15	0.77
Scott Cohen	9	792	8	9	0.67
Stefan Gössling	8	718	7	8	0.70
Debbie Hopkins	5	187	4	5	0.80
Paul Hanna	4	186	4	4	1.00
Andreas Humpe	3	420	3	3	1.00
Arianne Reis	3	294	3	3	0.60
Christina Cavaliere	3	403	3	3	0.60
Stephen Rice	3	82	3	3	3.00
Nicole Cocolas	3	49	2	3	0.67

Own work adapted from: Malhotra (2024)

Journals

Leading publication venues in this review include the *Journal of Sustainable Tourism*, *Tourism Management*, and *Journal of Air Transport Management*, with 10, 5, and 4 articles, respectively. A salient finding of the present study is the predominance of the top five outlets, which account for over half of the publications, with the top ten sources collectively comprising nearly 80% of the examined literature. When looking at their total citations, *Global Environmental Change* occupies the preeminent position, followed by the *Journal of Sustainable Tourism* and the *Journal of Cleaner Production*. The h-index was the highest for the *Journal of Sustainable Tourism*. This is also the case for the g-index. When looking at the m-index, *Technology in Society* was the most influential one in the sample. This is again, most likely due to its short contribution period to the reviewed material. *Journal of Air Transport Management* and *Transportation Research Interdisciplinary Perspectives*, already having a high m-index in the corpus, have an even higher impact in their overall field. Also, *Technology in Society* is a leader in its discipline, although not as pronounced as in the current analysis. *Annals of Tourism Research* showed the biggest discrepancy between the dataset and its overall impact. Having the smallest influence when looking at the sample, the outlet has an m-index greater than 4 in its field, meaning a very pronounced impact. Table 2.2 presents the most influential journals ranked by bibliometric indices.

Table 2.2: Most Prominent Journals in the Dataset

Name of Journal	Number of Papers in the Dataset	Total Citations	H-Index	G-Index	M-Index
Journal of Sustainable Tourism	10	328	7	10	0.64
Journal of Air Transport Management	4	295	4	4	1.00
Journal of Cleaner Production	4	315	4	4	0.67
Journal of Travel Research	4	161	4	4	0.50
Tourism Management	5	295	4	5	0.42
Technology in Society	3	82	3	3	3.00
Annals of Tourism Research	2	226	2	2	0.29
Global Environmental Change	2	387	2	2	0.67
Transportation Research Interdisciplinary Perspectives	2	26	2	2	1.00

Own work adapted from: Malhotra (2024)

The h-index is based on the idea that the number of citations a scientist's work receives is a stronger indicator of its significance than just the quantity of publications or the prestige of the journals. By considering both paper count and reference impact, it allows for meaningful comparisons between researchers. Unlike the h-index, the g-index places greater emphasis on highly cited papers to address a limitation of the h-index, where additional references to already prominent papers no longer contribute. Furthermore, while the h-index is valued for its robustness in reflecting the quantity of a researcher's core contributions, the m-index highlights the qualitative impact of those works and effectively accounts for skewed citation distributions (Bornmann et al., 2008; Cabrerizo et al., 2010; Hirsch & Buela-Casal, 2014).

The three different indices were identified/calculated as follows:

- The h-index of a researcher is n if at least n published articles have each been cited at least n times. In other words, when listing an author's papers in descending order of reference count, the h-index corresponds to the highest rank where the number of citations is still equal to or greater than the position itself.
- The g-index is also determined by ranking a researcher’s works in decreasing order of citations. It is defined as the largest number of g such that the top g articles collectively have received at least g^2 references. This means that as long as the square of the rank is greater than or equal to the total citations of the top-positioned papers, that value represents the g-index.

- The m-index is a normalised version of the h-index, accounting for the length of a researcher's career. It is calculated by dividing the h-index by the number of years between the first and most recent publication within the dataset.

The same definitions and calculation methods were applied to assess journal impact.

Articles

The paper with the most global citations from the dataset was "The global scale, distribution and growth of aviation: implications for climate change", published by Gössling and Humpe in 2020. When looking at the local citations, "Binge flying – behavioural addiction and climate change", written by Cohen et al. in 2011, was the most widely cited. While comparing the local to the global citations, "Canary in the coalmine: Norwegian attitudes towards climate change and extreme long-haul air travel to Aotearoa/New Zealand" by Higham and Cohen from 2011 received the greatest ratio. In the overall sample, global and local citation counts were the highest for the articles published in 2020. Table 2.3 lists the most influential articles regarding local and global citations. Some paper titles were shortened to preserve table brevity.

Table 2.3: Most Influential Articles by Citation Count and Impact Metrics

Name of Article	Authors	Year	Global Citations	Local Citations	LC/GC Ratio
Binge flying	Cohen et al.	2011	168	8	4.76%
Canary in the coalmine	Higham & Cohen	2011	121	8	6.61%
The global scale, distribution and growth of aviation	Gössling & Humpe	2020	267	7	2.62%
Can we fly less?	Gössling et al.	2019	131	5	3.82%
Climate change, tourist air travel and radical emissions reduction	Higham et al.	2016	144	5	3.47%
Does 'flight shame' affect social norms?	Gössling et al.	2020	130	5	3.85%
Climate change, discretionary air travel, and the "flyers' dilemma"	Higham et al.	2014	91	3	3.30%
Identity and tourism mobility	Hibbert et al.	2013	112	3	2.68%

Own work adapted from: Malhotra (2024)

Global Citation (GC) indicates the total count of references an article has received from all sources indexed in databases such as Scopus, Web of Science, or Google Scholar. In contrast, Local Citation (LC) indicates the number of times a source has been referenced by other documents within a specific search scope, essentially, within the specialised set of papers being analysed. In this context, it represents citations within the sample of this literature review (Batista-Canino et al., 2023). The ratio of LC to GC provides insights into the relative influence of a paper within a specific research domain compared to its overall impact across the broader academic landscape. A higher ratio suggests that the document is highly relevant and frequently referenced within the specialised set of articles under review, indicating its centrality to that particular field or niche area of study. Conversely, a lower ratio implies that while the work may have broader scholarly recognition, it is less frequently cited within the specific literature sample, potentially indicating a more general impact beyond the focused research area (Batista-Canino et al., 2023).

These metrics collectively inform RQ3 by identifying the most influential contributors, articles, and publication venues in the field. See Appendix D for complete impact calculations.

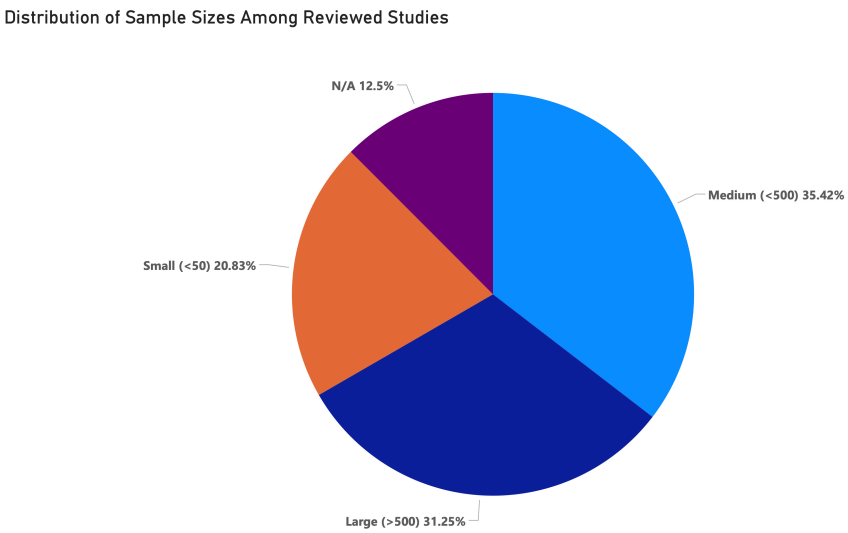
2.2.1.3 Organisations

Among the most active organisations in the dataset were the University of Otago in New Zealand, the University of Surrey in the UK, and Linnaeus University in Sweden, with 13, 10, and 8 articles published, respectively.

2.2.1.4 Sample Size

According to Graphic 2.3, most of the 48 studies had a medium sample size with less than 500 participants, followed by large (> 500) and small (<50). In some articles, no explicit cohort number was stated.

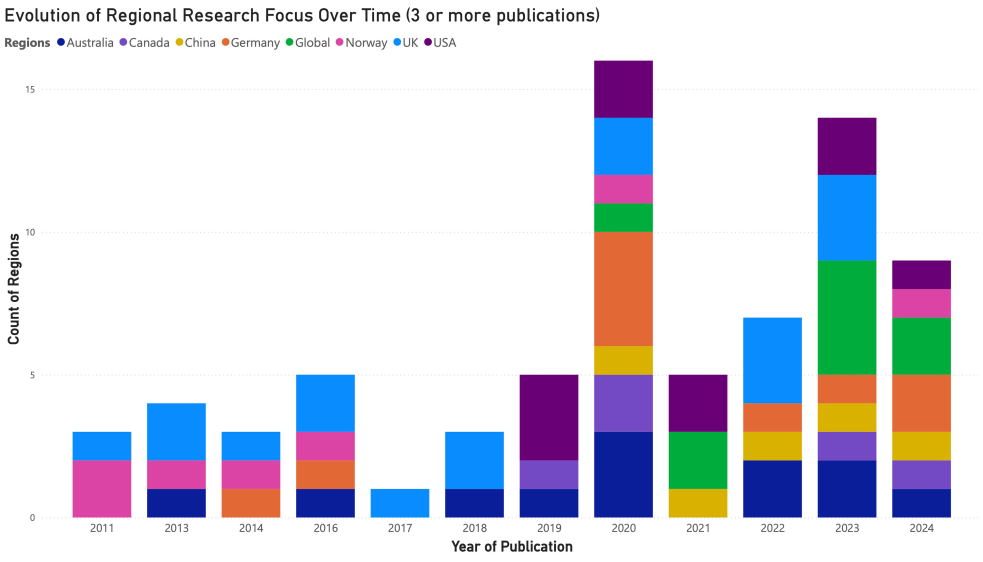
Graphic 2.3: Distribution of Sample Sizes Among Reviewed Studies



2.2.1.5 Regions

Research in this area has predominantly focused on populations in the UK, Australia, or Germany. However, the first investigations were focused on Norway and the UK, Germany and Australia only started to pick up later on. Since 2019, there has also been an increase in studies performed with participants from Canada, China, and the US, as well as some global initiatives, as shown in Graphic 2.4.

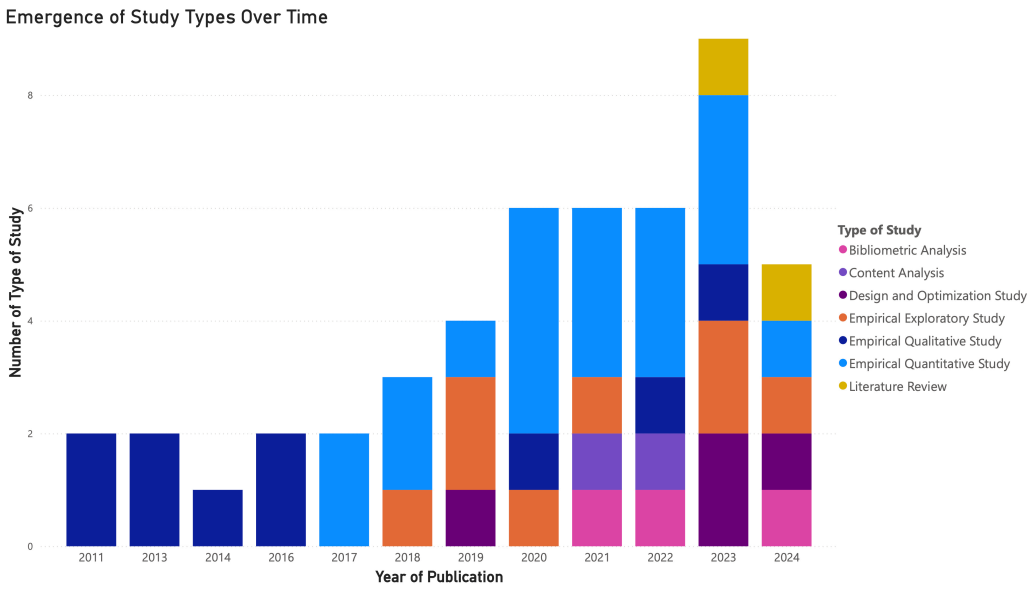
Graphic 2.4: Evolution of Regional Research Focus Over Time



2.2.1.6 Study Design & Type of Study

Most papers used quantitative methods, followed by qualitative and mixed methods. Nevertheless, from 2011 to 2016, qualitative designs were more common, with a shift toward quantitative approaches in later years. Bibliometric analyses and design and optimisation studies have been present throughout the recent review period. Since 2021, however, literature reviews and content analyses have become more prominent (Graphic 2.5).

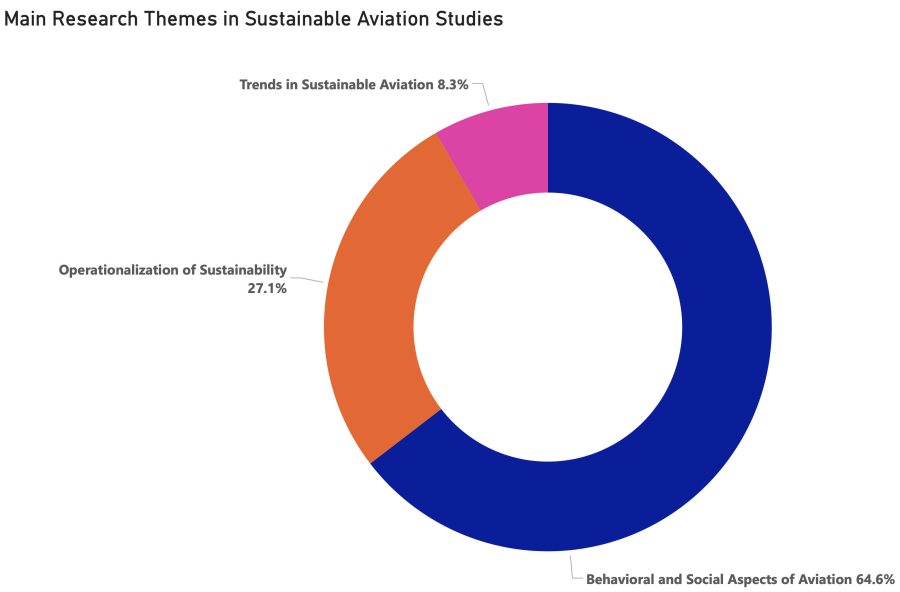
Graphic 2.5: Emergence of Study Types Over Time



2.2.1.7 Research Focus

A significant share of articles in the dataset addressed behavioural and social aspects of aviation, followed by the operationalisation of sustainability and trends in the field. Thereby, attitudinal papers were also the first ones to be conducted between 2011 and 2017. Afterwards, operational and trend studies started to appear. Those became dominant in recent years. Graphic 2.6 visualises the distribution of research focus areas, with behavioural and social topics making up 64.6% of the articles, operationalisation accounting for 27.1%, and trends comprising 8.3% of the sample.

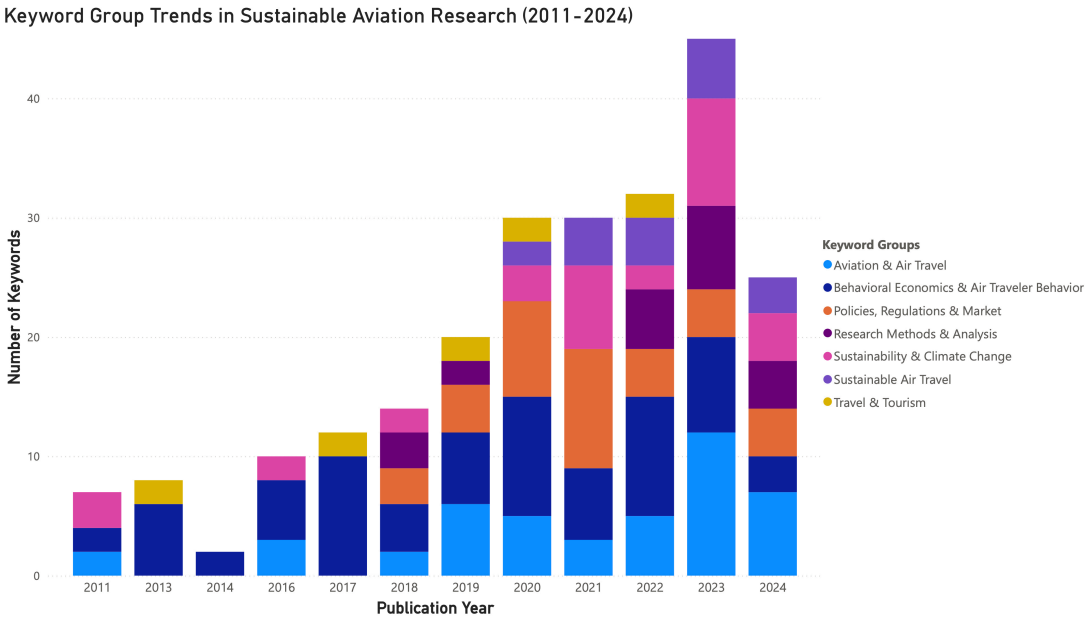
Graphic 2.6: Main Research Themes in Sustainable Aviation Studies



2.2.1.8 Keywords

The most used keywords were aviation, climate change, and air travel. When clustered into groups, “Aviation & Air Travel”, “Behavioural Economics & Air Travel Behaviour” and “Sustainability & Climate Change” were the first ones to be used in 2011, followed by the emergence of “Travel and Tourism” in 2013. Research on “Policies, Regulations & Market” as well as on “Research Methods & Analysis” gained academic interest only after 2018. A strong concentration on terms regarding “Sustainable Aviation” started to appear from 2020 onwards. Graphic 2.7 illustrates the evolution of keyword group usage over time, highlighting the diversification of academic focus areas and the increased attention to policy frameworks, traveller behaviour, and explicitly labelled sustainability topics in recent years. This visual supports the observed shift in scholarly priorities and directly informs RQ2.

Graphic 2.7: Keyword Group Trends in Sustainable Aviation Research



The visualisations not presented in this section can be found in Appendix C.

The preceding descriptive synthesis provides an empirical foundation for understanding how eco-friendly aviation research has evolved (RQ1) and identifies the most influential authors, articles, and journals in the field (RQ3). Building on this, the following section transitions into a thematic synthesis of the reviewed literature. This part moves beyond bibliometric characteristics to examine the conceptual and analytical content of the studies. It directly addresses the remaining research questions concerning current academic trends (RQ2), dominant thematic areas (RQ4), and the future scope of green air travel literature (RQ5). To structure this synthesis effectively, the papers are organised into three focus areas: (1) Trends in Sustainable Aviation, (2) Operationalisation of Sustainability, and (3) Behavioural and Social Aspects of Aviation.

2.2.3 Thematic Synthesis

In the comprehensive examination of sustainable aviation and its evolution over time, numerous studies have provided noteworthy insights and trends. This paper will delineate the findings from the 48 relevant articles, which will be divided into the aforementioned research foci.

2.2.3.1 Trends in Sustainable Aviation

Shift Toward Technology-Driven Research

A notable development within air travel academia is the growing emphasis on tech-driven and alternative energy systems in recent years. Dinçer et al. (2024) identified "engineering" and "energy fuels" as the primary low-emission aviation research areas from 2001 to 2023. As in this article, the majority of papers were published between 2020 and 2023. The US and the Chinese Academy of Sciences were dominant in citations, and "sustainable aviation fuel" was the most frequent keyword. The study also highlighted evolving themes, shifting toward more complex, technology-oriented scholarly topics in recent years (Dinçer et al., 2024). Due to the exclusion of technology-based articles and the focus on tourism and economic aspects of aviation, those results differ significantly from the descriptive results of this paper.

Growth of Optimisation Models

Efficiency-driven modelling is a growing trend in sustainable aviation research, typically based on operations-focused approaches. Thereby, nonlinear programming dominates gate assignment and trajectory optimisation, while mixed-integer linear programming is applied in tow-vehicle operations and runway scheduling. Most models, except pushback control, rarely incorporate uncertainty (Chen et al., 2024).

Climate Commitments

Recent studies have increasingly addressed the environmental and economic dimensions of aviation, focusing on emissions, ecological impact, and climate mitigation. Leal Filho et al. (2023) found that most major airlines committed to cutting CO2 emissions in half by 2050, emphasising SAF adoption and infrastructure expansion in emerging markets. Similar commitments are evident among airports, as shown by the Airport Carbon Accreditation (ACA) program, particularly prominent in Europe (Dube, 2021).

2.2.3.2 Operationalisation of Sustainability

Gaps in Policy Effectiveness

Concerns have emerged around whether existing regulatory frameworks sufficiently address the full scope of the sector's environmental impact. Gössling and Humpe (2020) argue that prevailing climate policies fail to address a significant portion of aviation carbon output, particularly those generated by affluent frequent fliers. As a result, programs such as CORSIA and EU ETS are unlikely to reduce greenhouse gas levels effectively. The study calls for more comprehensive governance targeting unaccounted-for emissions and high-frequency travellers (Gössling & Humpe, 2020).

The Role of Innovation and Integrated Approaches

To initiate climate action on the industry level, several articles in the dataset addressed the operationalisation of sustainability in the aviation sector. Qiu et al. (2021) propose an integrated framework involving innovation, policy support, public participation, and cooperation to drive sector-wide change. Hu et al. (2022) identify demand, aircraft efficiency, alternative fuels, and air traffic optimisation as key levers, recommending both short-term policies (e.g., carbon taxes) and long-term technological advances. The study also underscores the need for aircraft recycling and disassembly infrastructure to complement future development strategies (Hu et al., 2022).

Composite Indices and Multi-objective Models

Measuring and modelling sustainability in aviation has become increasingly important for informing policy and operational decisions. Therefore, Koo et al. (2023) proposed a composite index to evaluate the environmental impact of air routes to and from Australia, highlighting tourism-environment trade-offs and the need for tailored policy support. Moreover, Parsa et al. (2019) introduced a multi-objective optimisation model for fleet management that could reduce U.S. domestic aviation emissions by up to 10%. Building on this, Li and Merkert (2023) incorporated door-to-door carbon accounting, showing ground transport can account for up to 22% of short-haul emissions. They further emphasised improving greenhouse gas tracking, aligning with EU taxonomy criteria, and integrating carbon metrics into financial disclosures. Keiser et al. (2023) explored the application of life cycle assessment (LCA) in aircraft design, fuel sourcing, and operations, identifying a limited system-wide scope. In a related effort, Al-Hilfi et al.

(2023) proposed a decentralised baggage sorting network across the UK to reduce aircraft weight and associated carbon output, illustrating the role of logistics optimisation in operational sustainability.

Alternative Fuels

In addition to adjustments in baggage operations, alternative energy sources can also be a major sustainability screw. Mueller et al. (2024) analysed the macroeconomic impacts of integrating Power-to-Liquid (PtL) fuels into the aviation sector and found that low blending quotas (e.g., 10%) have limited effects on GDP, whereas higher quotas (e.g., 50%) could cause sectoral disruptions unless accompanied by policy instruments such as subsidies, carbon pricing, and differentiated taxation (Mueller et al., 2024). Gössling and Humpe (2023) proposed a 4% annual drop in quota for SAF, which would eliminate fossil energy use in aviation by 2050. However, they caution that fuel pricing, non-CO_2 emissions, and distribution infrastructure remain critical barriers that must be addressed alongside market-based measures (Gössling & Humpe, 2023).

Demand-Side Solutions and Equity Considerations

Achieving sustainability in tourism, particularly in the context of aviation, necessitates considerations beyond operational and technological improvements. Several studies argue that demand-side measures are essential to realising aviation-related climate goals while maintaining social and economic balance. Sun et al. (2020) showed that targeting low-carbon travel segments and promoting behaviour change among environmentally conscious tourists can significantly reduce emissions, although such strategies may create trade-offs in economic performance. Furthermore, Peeters and Papp (2024) introduced a Zero Emissions Tourism (ZET) scenario combining emission-neutral aviation with fair airlift allocation and SAF mandates. Their model enables a continuation of international tourism under global equity principles, shifting the conversation toward distributive justice and long-term system change (Peeters & Papp, 2024).

2.2.3.4 Behavioural and Social Aspects

Cognitive Dissonance and Rationalisation Strategies

In addition to examining research trends in sustainable aviation and the operationalisation thereof, numerous scholars have investigated passenger behaviour and its social implications within this context. Many scholars highlight how travellers reconcile climate concerns with frequent flying. One of the earliest studies in the dataset identified cognitive dissonance in holiday flying, where participants used guilt suppression and denial to justify actions, portraying it as a potential compulsive habit (Cohen et al., 2011). In the same year, Higham & Cohen (2011) similarly noted a disconnect between climate awareness and actual behavioural change. Participants justified their flying through claims of infrequency or by consolidating trips. A notable share rationalised their decision-making with an "air travel with a carbon conscience" approach, opting for longer stays or multi-destination trips (Higham & Cohen, 2011). This assertion is further supported by the findings of Higham et al. (2014), where convenience, cost, and lifestyle consistently overrode climate considerations (Higham et al., 2014).

Effectiveness of Economic Measures and Carbon Pricing

Despite the consensus among scholars regarding the divergence between sustainability concerns and air travel behaviour, certain factors and measures have the potential to increase awareness, WTP, and change in this domain. While many passengers express support for sustainability, the effectiveness of market-based interventions varies. Higham et al. (2016) found carbon offsetting to be largely ineffective due to public scepticism, whereas structural measures like carbon taxes or travel subsidies had more influence, particularly in Norway. Seetaram et al. (2018) and Wild et al. (2021) also reported broad support for green taxation, especially if revenue is invested in sustainable aviation technologies, though behavioural change remained limited. Willingness to pay (WTP) was higher for longer or premium trips and correlated with personal booking habits (Seetaram et al., 2018; Wild et al., 2021). Contrary to the findings of Higham et al. (2016), Seetaram et al. (2018), and Wild et al. (2021), Gössling et al. (2020) showed that while policies such as emission reductions or labelling were supported, direct restrictions or fare increases were more controversial. Markham et al. (2018) similarly found that Australia's carbon pricing scheme had little impact on domestic travel demand. Moreover, Tyers (2018) noted that nudges, such as social endorsements or emotional

appeals, were largely ineffective unless redesigned to emphasise peer influence and clear messaging. Offset purchases were thereby more influenced by individual climate concerns, group size, and the perceived trustworthiness of the program (Tyers, 2018). Zhang et al. (2022) also found that certification, transparency, and financial implications shape offset preferences. Further, Rice et al. (2020) confirmed that higher GHG reduction levels increased WTP. Additional studies found that general and aviation-specific sustainability knowledge (Ragbir et al., 2021), trust in innovation (Han et al., 2019), and concerns over biofuel impacts (Xu et al., 2022) also influence WTP.

Role of Identity and Psychological Drivers

Identity, emotions, and values are central to sustainable travel behaviour. Hibbert et al. (2013) found that self-image strongly predicts travel choices, often overriding climate concerns. Kim and Hyun (2021) and Winter et al. (2021) also showed that pro-environmental affiliation is linked to a higher willingness to pay and support for green aviation policies. Emotional engagement, particularly caring and happiness, was shown to mediate the link between climate perception and sustainable conduct (Ragbir et al., 2021). In contrast, Alcock et al. (2017) and Cohen et al. (2014) have indicated a divergence between household and flight habits. While climate concerns and pro-environmental demeanour might be common in day-to-day practices, this is not necessarily an indicator of eco-friendly discretionary flight choices. Socio-demographic factors such as age, income, and social class thereby also influence sustainable choices (Gössling et al., 2020; Seetaram et al., 2018). Furthermore, peer behaviour, social media exposure, and cosmopolitan perception shape attitudes toward flying and can normalise frequent air travel (Oswald & Ernst, 2021). In addition, Cocolas et al. (2020) argued that flying is embedded in social norms and identity, making change psychologically and socially difficult. Thereby, flights of greater duration were predominantly regarded as more important, particularly for significant personal or professional reasons. The results of Gössling et al. (2019) also showed that not all air travel is deemed necessary. Akan et al. (2022) found that preferences for green airlines are driven by perceived behavioural control, subjective norms, and attitudes. A separate analysis of business travellers reveals that their frequency of travel is primarily influenced by cultural factors and the trust-building requirements associated with face-to-face interactions. Consequently, the

purpose of the meeting, the complexity of the message, and the geographical location emerge as pivotal factors influencing these preferences (Müller & Wittmer, 2023).

Strategic Messaging and Industry Communication Gaps

Communication efforts around sustainable aviation play a key role in shaping public perceptions and travel behaviour. Thereby, Higham et al. (2024) found that "persuadables" respond best to values-based framing that emphasises emotional appeal and personal relevance. Cocolas et al. (2023) supported this, noting that value-expressive messages are particularly effective among climate-concerned individuals, especially when central argument strategies are applied. Moreover, Büchs (2017) highlighted that self-directed, morally framed narratives can reduce air travel. Hardeman et al. (2017) added that messages linking self-benefits and social norms, especially when culturally tailored, are most effective. Yet, according to Higham et al. (2022), most airline messaging continues to emphasise adventure, exclusivity, and urgency, reinforcing unsustainable narratives. Similarly, Hopkins et al. (2023) argued that flight operators often shift environmental responsibility to governments or consumers, while portraying themselves as inclusive and forward-looking. This selective storytelling helps legitimise continued growth. Cohen et al. (2022) observed similar dynamics among luxury travellers on social media, where the display of wealth and freedom encourages aspirational flying among followers. Fletcher et al. (2019) reported that many young people anticipate continued high-carbon mobility, with faith placed in technological innovation rather than behavioural change.

To support the thematic synthesis, the dominant themes, associated subtopics, representative studies, and key findings were consolidated into a structured overview. This directly addresses RQ4, which concerns the main areas of focus in sustainable aviation research. Table 2.4 presents an overview of the identified themes, focus areas, and key articles covered in the synthesis. The table also serves as a bridge to the following discussion, where these findings are interpreted concerning research gaps, practical implications, and future directions.

Table 2.4: Thematic Overview of Sustainable Aviation Literature

Theme	Subtopics/Focus Areas	Representative Studies	Key Insights
Trends in Sustainable Aviation	Research growth, SAF development, emission targets, optimisation models	Dinçer et al. (2024); Leal Filho et al. (2023); Chen et al. (2024)	The field has grown rapidly since 2020; emphasis on fuel innovation, optimisation, and emissions goals.
Operationalisation of Sustainability	Policy frameworks (CORSIA, EU ETS), alternative fuels, lifecycle assessments, indices, system design	Gössling & Humpe (2020); Qiu et al. (2021); Hu et al. (2022); Li & Merkert (2023)	Highlights need for coordinated tech, policy, and infrastructure interventions; slow practical uptake.
Behavioural and Social Aspects	Willingness to pay (WTP), cognitive dissonance, identity, messaging, carbon offsetting	Cohen et al. (2011); Rice et al. (2020); Higham et al. (2016); Kim & Hyun (2021)	Behaviour is key to sustainable transition; awareness is high but action lags; identity and emotion matter.
Communication & Marketing	Message framing, values-based appeals, greenwashing, airline narratives	Cocolas et al. (2023); Higham et al. (2024); Hopkins et al. (2023)	Effective communication can influence action, but the industry still relies on aspirational messaging.
Equity and Climate Justice	Distributional effects, Zero Emissions Tourism (ZET), global divides	Peeters & Papp (2024); Sun et al. (2020)	Highlight ethical concerns; sustainable aviation must account for global equity and tourist segmentation.

All studies contributing to the syntheses met the CASP quality and bias criteria. Minor concerns included a regional concentration in Western contexts and limited methodological diversity within some thematic categories, which may affect the generalisability of findings.

2.3 Discussion

Building on the results of both the descriptive and thematic synthesis, this section critically interprets the key outcomes concerning the research questions, evaluates their broader implications, and outlines future study directions and practical considerations for advancing eco-friendly air travel within the tourism context.

Based on the findings, the investigation into sustainable aviation remained a niche until 2017. However, there was a significant growth in papers since 2020, peaking in 2023

(RQ1). This reflects increased public and political pressure, especially after COVID-19, evolving climate targets, and SAF innovation momentum (Dinçer et al., 2024). Regarding the current scholarly trends (RQ2), behavioural studies were dominant in the beginning (Cohen et al., 2011; Higham & Cohen, 2011), with policy, operationalisation, and SAF technologies being increasingly prioritised in the past four years. However, there has been a recent return of interest in consumer awareness and demand-side measures, signalling a more balanced academic agenda (Leal Filho et al., 2023; Gössling & Humpe, 2020; Higham et al., 2024). The field is concentrated around a few authors, e.g. Higham, Gössling, and Cohen (see Table 2.2), as well as journals like the Journal of Sustainable Tourism and Tourism Management (RQ3). This limits knowledge diversity and may lead to repetitive perspectives and narrow theoretical development, especially since research is regionally and ideologically aligned. Moreover, the dominant themes in sustainable aviation literature are passenger behaviour and WTP, emissions policy, SAF and tech adoption, communication gaps, and climate equity (RQ4). There is also a growing use of indices, modelling, and life cycle assessments, suggesting more quantitative sophistication (Chen et al., 2024; Keiser et al., 2023). Concerning the future scientific scope (RQ5), literature frequently calls for stronger governance frameworks and research into passenger psychology and messaging. In addition, according to the authors of the included articles, integrated tech-behavioural models and more investigations on Global South tourism markets are still missing (Peeters & Papp, 2024; Sun et al., 2020).

Analysis revealed significant geographic gaps, with the field remaining predominantly Western-centric (see Graphic 2.4). This risks missing context-specific challenges faced by developing countries, especially those reliant on long-haul travel. Early research mainly used qualitative methods and theory-building, while in recent years, quantitative models, optimisations, and simulations have become more prominent. Such a shift indicates a methodological maturation of the field, but risks underestimating human and social complexity if not balanced with qualitative insights. According to some authors, there is a disconnect between industry action and academic recommendations. Airlines continue to favour aspirational marketing over sustainable behaviour change strategies (Higham et al., 2022; Hopkins et al., 2023). The literature critiques this strongly, calling for alignment between messaging, operational action, and climate targets.

Several limitations were encountered in conducting this review, namely language bias, database and format filters, as well as scope. Therefore, English-only inclusion may omit non-Western perspectives and overlook region-specific innovations. Moreover, eliminating lower-ranked journals or grey literature may bias the sample toward academia and miss practitioner insights. Lastly, the focus on tourism-related studies omits important engineering or SAF production literature.

The findings of the paper carry several important implications for policymakers, industry stakeholders, and the academic community, particularly in guiding practical action, improving communication strategies, and shaping future scientific priorities in sustainable aviation. While structural interventions (e.g. carbon taxes, SAF mandates) are essential for systemic change, they alone do not significantly alter individual travel behaviour (Wild et al., 2021; Higham et al., 2016; Tyers, 2018). This suggests that policy must be complemented by behavioural insight strategies, such as climate education, peer-based interventions, or norm activation, to have meaningful effects on consumer decisions. Policymakers should also be aware of equity implications, ensuring that demand management tools do not disproportionately affect lower-income or marginalised travellers. Airlines and travel companies should focus less on generic sustainability messaging or offset schemes and more on value-based, identity-aligned communication strategies. Among the many factors influencing sustainable travel demeanour, the literature consistently highlights self-image, emotional engagement (e.g., caring, happiness), and personal values as stronger predictors than policy nudges or pricing mechanisms (Kim & Hyun, 2021; Ragbir et al., 2021; Winter et al., 2021). Therefore, advertisements should leverage self-perception, social norms, and emotional engagement to shift travel behaviour. Likewise, destination marketing and transport planning should incorporate psychologically informed approaches, promoting low-carbon travel as part of a valued, meaningful tourism experience. Longer stays, fewer but richer trips, and the integration of ground alternatives could be better aligned with emerging traveller values. Regarding implications for academia, there is a growing need for interdisciplinary collaboration, combining behavioural science, tourism studies, technological insights, and climate policy to design more effective interventions. Furthermore, the geographic scope should be broadened to reflect underrepresented regions (Latin America, Africa, Asia). Additional research should also focus on institutional narratives and airline

decision-making, not only on consumer behaviour. Moreover, there is a need to examine climate justice and demand-management models for equity-based tourism strategies (Peeters & Papp, 2024).

This review offers a comprehensive, systematic overview of sustainable aviation within tourism, combining descriptive patterns with thematic depth. It shows that while academic interest is growing, research and industry practice remain misaligned in many areas. Achieving eco-friendly air travel requires collaboration across sectors, a shift in communication culture, and deeper engagement with behavioural motivations. Therefore, the field must prioritise equity, values, and systems thinking to meet the challenges ahead. While numerous studies have quantified willingness to pay for greener air travel, the underlying motivations, perceived barriers, and psychological trade-offs that shape this inclination remain insufficiently explored (Rice et al., 2020; Xu et al., 2022). Addressing this critical gap will be the focus of the next article.

Chapter 3. SECOND ARTICLE

3.1 Methodology

This section describes the methodological approach, including survey design, data collection procedures, and the analytical tools applied to explore the relationships between motivations, constraints, awareness, frequency, and WTP. This investigation reveals critical insights into the factors that encourage or hinder consumer engagement with sustainable aviation. Such an approach is crucial since industry and policy actors are under growing pressure to align climate goals with traveller preferences and behaviours.

3.1.1 Research Design and Data Collection

The study employed a quantitative research design to examine the behavioural dynamics underlying support for sustainable air travel. Data were collected using an online survey administered via Google Forms to ensure broad accessibility and ease of sharing. The questionnaire ran for four months, from September 16, 2024, to January 16, 2025.

To reduce measurement bias, survey items were phrased in neutral, non-leading language, and multiple answer formats were used to encourage balanced responses. In addition, items were pilot tested with 13 individuals to identify and correct any ambiguous or suggestive wording before full deployment. The author initiated snowball sampling by distributing the final questionnaire through academic and professional networks and actively shared the survey across platforms, including LinkedIn, WhatsApp, Instagram, Facebook, Snapchat, and a company platform (Beekeeper), via both direct messages and public posts. Using this technique**,** initial participants were asked to refer the survey to others. Social connections are leveraged to progressively recruit additional respondents, making it especially effective for accessing specific or hard-to-reach populations (Goodman, 1961). This approach was chosen to maximise reach and engagement. Participation was voluntary, anonymous, and confidential, with no personal identifiers collected.

3.1.2 Survey Instrument

The questionnaire aimed to capture attitudes and decision-making processes related to sustainable air travel. It included primarily closed-ended questions, along with "Other" response options to accommodate additional input. Building on gaps identified in the literature, the poll covered five key areas: personal motivations, perceived barriers, travel frequency, sustainability awareness, and WTP. However, the form also gathered demographic information. Thereby, the survey measured WTP and sustainability awareness using a 4-point Likert scale (not, slightly, moderately, very aware/willing) and assessed travel frequency on a 6-point scale, representing increasing flight activity levels. Appendix E contains the complete questions, their rationale and a comprehensive table with all survey responses.

3.1.3 Sample Size

The survey gathered 432 valid responses. In this context, a robust sample size is essential for reliable analysis. To determine an appropriate sample size for this survey measuring proportions, the following formula was used (Cochran, 1977):

$$n = \frac{Z^2 \cdot p \cdot (1 - p)}{E^2}$$

- n = required sample size
- Z = Z-score associated with the desired confidence level
- p = estimated population proportion
- E = margin of error

For this study (common values)

- 95% confidence level: Z = 1.96
- Estimated population proportion: p = 0.5
- Margin of error: E = 0.05

$$\frac{(1.96)^2 \cdot 0.5 \cdot (1 - 0.5)}{(0.05)^2}$$

$$\frac{3.8416 \cdot 0.25}{0.0025} = \frac{0.9604}{0.0025} = 384.16$$

Conclusion

A minimum of 385 respondents is recommended to achieve the desired precision with 95% confidence and a 5% margin of error. The final number of 432 exceeded this threshold, ensuring statistical power and representativeness.

3.1.4 Data Analysis

Multiple evaluations have been conducted as part of this paper. First, descriptive analysis summarised key sample characteristics, including demographics, air travel frequency, sustainability awareness, and WTP. Microsoft Power BI (version 2.138.1452.0, November 2024) generated visualisations to display response distributions and central tendencies. These outputs highlighted patterns in the data and offered insights into behavioural and attitudinal trends related to sustainable air travel.

Furthermore, inferential analysis was performed in SPSS (version 20), using independent samples t-tests and One-Way ANOVA to examine differences in WTP, awareness, and frequency across demographic and behavioural groups. For example, a t-test compared WTP between genders, while ANOVA assessed WTP variation across income levels. “An independent samples t-test compares the means of two groups” (Ross & Willson, 2017:13). Consequently, different individuals contribute scores to each segment. Moreover, it aims to ascertain whether there are significant deviations between the two categories (Academic Success Center, 2024). “The ANOVA test is a class of statistical analysis employed to evaluate whether two or more datasets have been statistically significant by examining the differences of averages utilizing variance” (Laverty et al., 2019; Thango, 2022:6). Those results and disparities were also compared to the ones of the descriptive analysis.

In addition, this study examined complex relationships among key variables using Structural Equation Modelling (SEM), employing SPSS AMOS (version 30) and JASP (version 19.3). “Structural equation modelling (SEM), or path analysis, is a multivariate method used to test hypotheses regarding the influences among interacting variables” (Harrison et al., 2007:508). In this context, SEM enabled the analysis of direct and indirect effects among motivations, constraints, air travel frequency, sustainability

awareness, and WTP, offering a detailed understanding of how these factors influence support for sustainable air travel (Harrison et al., 2007). The analysis relied on Maximum Likelihood (ML) estimation, a widely adopted method in SEM that identifies model parameters by maximising the likelihood of the observed data. It is particularly effective when data approximates multivariate normality and is well-suited for complex models involving direct and indirect effects (Schermelleh-Engel, 2003). In this study, ML was appropriate due to its robustness and efficiency in estimating relationships among latent variables.

Finally, a cluster analysis was used to identify traveller profiles based on similar patterns in demographics, travel frequency, awareness, and WTP (Johnstone et al., 2010). Groups were primarily formed based on respondents' purchase inclination, offering insights into segmentation strategies for industry stakeholders' effective targeting. Both hierarchical and k-means clustering were applied to ensure robustness and interpretability. Hierarchical clustering builds a tree-like structure of cohorts by successively merging or splitting groups based on their similarity, while k-means clustering partitions the data into a pre-defined number of segments by minimising the distance between data points and their assigned cluster centre (Jain, 2010; Ketchen Jr. & Shook, 1996).

The author selected each method and analytical tool based on its suitability for the data type and research objectives. Descriptive statistics helped identify overall patterns, while inferential tests (t-tests, ANOVA) verified group differences. SEM supported the analysis of complex relationships and mediation effects across multiple variables. Cluster analysis, using hierarchical and k-means techniques, enabled the segmentation of traveller profiles by behaviour and demographics. Microsoft Power BI facilitated data visualisation, SPSS supported statistical testing, and AMOS/JASP were used to conduct SEM, chosen for their reliability and accessibility. These tools are widely recognised in behavioural and tourism research for their analytical robustness. The methodology is therefore fully replicable using the specified tools and versions, supporting transparency of the findings.

All survey questions were fully completed due to mandatory responses, therefore, no missing data handling was required. Some categorical answers were recoded into numerical values for analytical purposes. Assumption checks for normality and

homogeneity of variance were conducted before inferential testing. However, multivariate conditions (e.g., multicollinearity, outliers) and response consistency were not explicitly assessed. To test the robustness of results, the SEM was refined through iterative testing of alternative path specifications, including bootstrapping, until acceptable fit indices and statistical significance levels were achieved. In addition, the cluster analysis was conducted using both hierarchical and k-means methods, and solutions with varying numbers of groups were compared to determine the most interpretable and stable segmentation.

3.2 Results

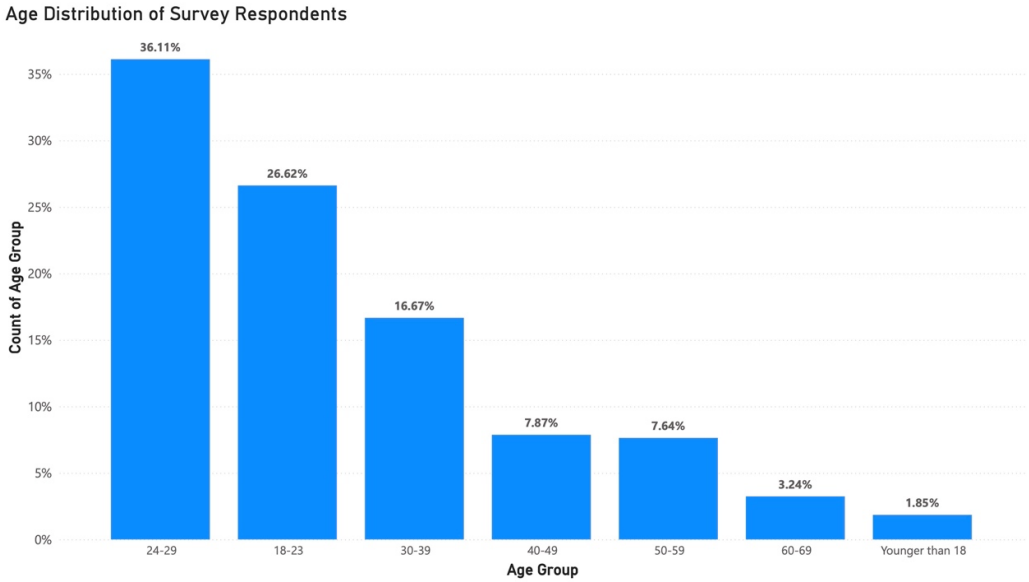
This section presents the key outcomes from the survey, organised into four parts: descriptive, inferential, SEM, and cluster analysis. Each subsection addresses a different aspect of the research questions, including behavioural patterns, demographic influences, and the interplay between motivations, constraints, frequency, awareness, and WTP. The findings of the 4th (Do you think that frequent flyers should be more responsible in supporting sustainable aviation options?), 7th (Do you believe that increased awareness of sustainable air travel options would make you more likely to support them?) and 9th (For which type of flight would you be more inclined to pay extra for sustainable options?) question have been discarded due to the lack of a "Neither" option that only emerged after the pre-test.

3.2.1 Descriptive Analysis

The following subsection provides an overview of the general trends observed in participants' responses. First, demographic characteristics are summarised to contextualise the findings and highlight variation across age, gender, nationality, education, employment status, and income. Second, it outlines the most frequently selected motivations and barriers to supporting sustainable air travel, as well as patterns in travel frequency, awareness of sustainability options, and WTP.

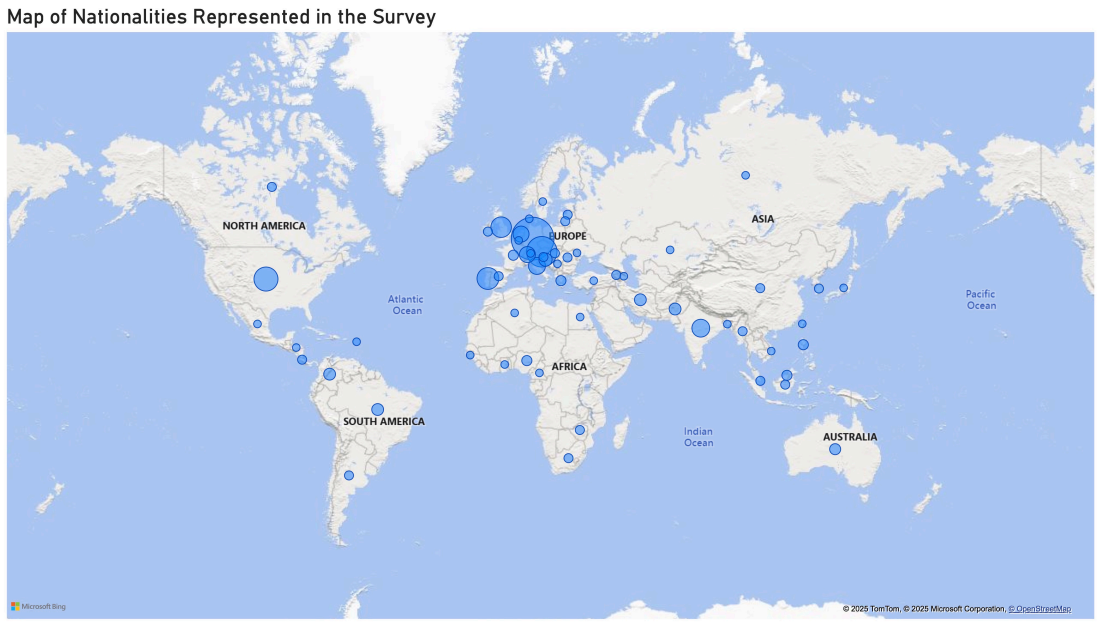
Most respondents identified as female (59 %), followed by male (40 %) and non-binary (1 %). Thereby, a majority was 24-29 years old, followed by 18-23 and 30-39, as shown in Graphic 3.1.

Graphic 3.1: Age Distribution of Survey Respondents



Moreover, Germany (36 %), Austria (17 %), and the US (10 %) were the most prominent nations in the sample. Graphic 3.2 portrays the global distribution.

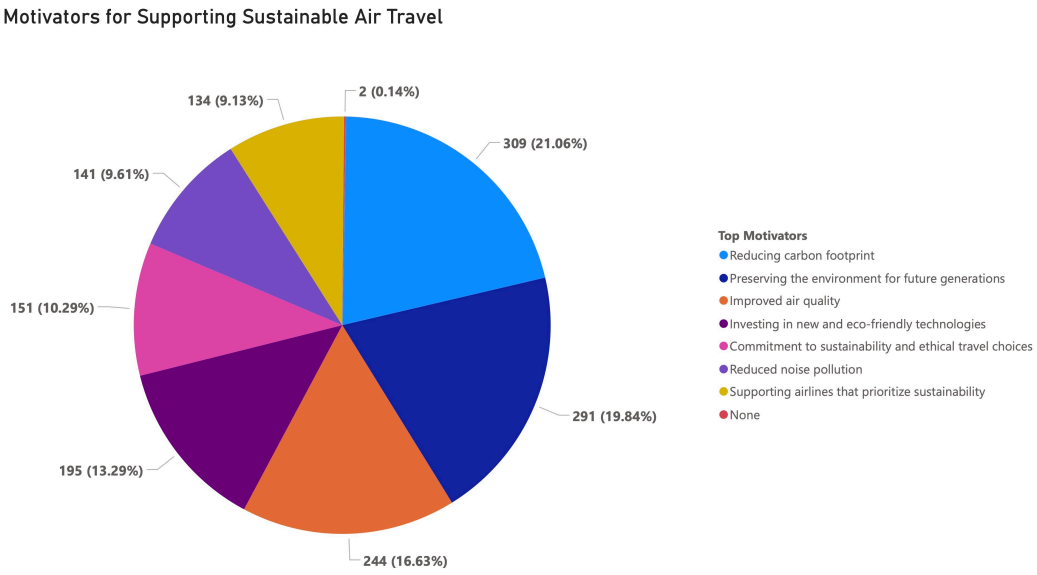
Graphic 3.2: Map of Nationalities Represented in the Survey



Regarding education and employment, most respondents held either a Bachelor's (38 %) or Master's degree (28 %) and identified as students (51 %) or employees (41 %). Income levels were concentrated in the lower-to-mid range, with most earning between €1,000-1,999 (24 %) or below €500 (19 %), followed by the €2,000-2,999 (13 %) bracket.

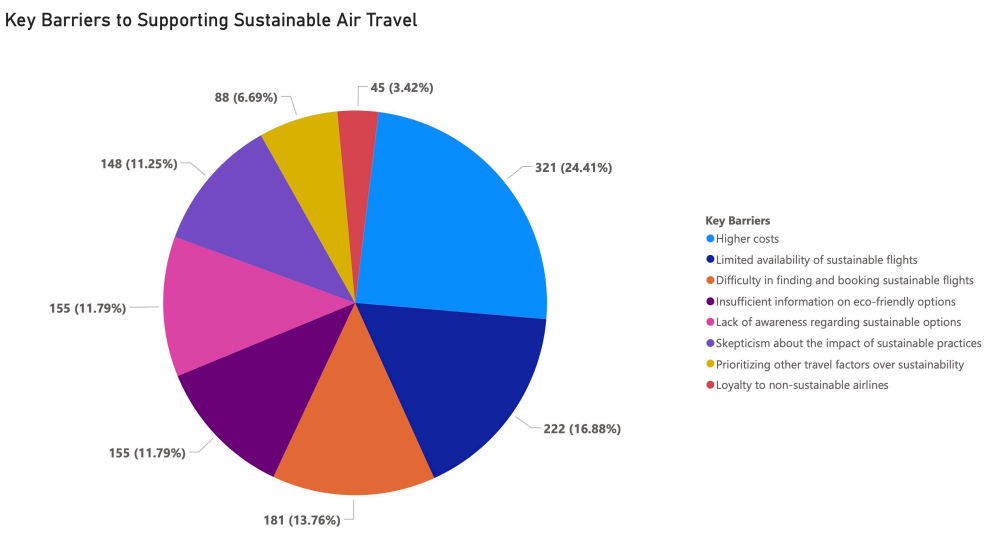
Among the most selected motivators were reducing carbon footprint, preserving the environment for future generations, and improved air quality (see Graphic 3.3).

Graphic 3.3: Top Motivators for Supporting Sustainable Air Travel



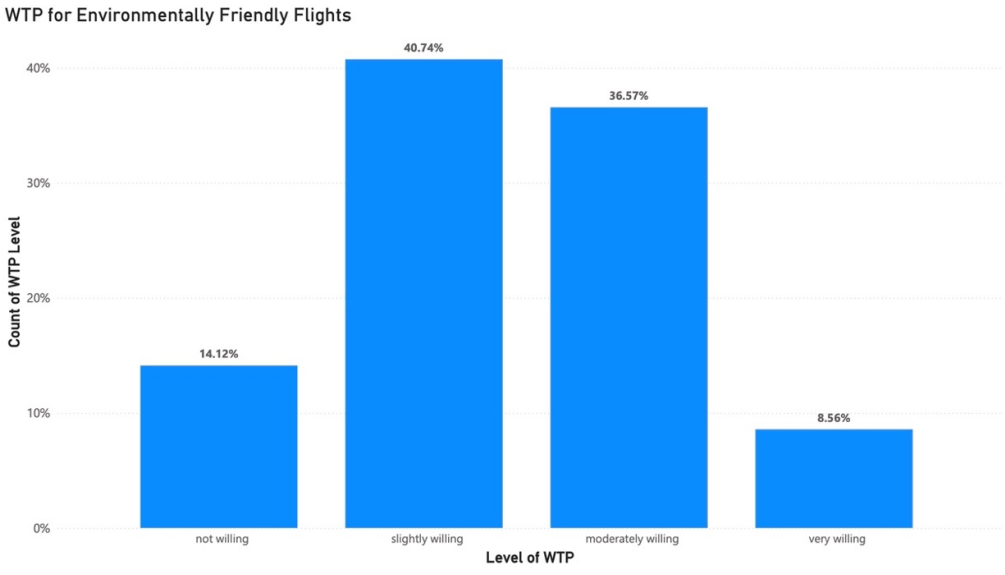
In turn, the most hindering factors were higher costs, limited availability of sustainable flights, and difficulty in finding and booking them (see Graphic 3.4).

Graphic 3.4: Key Barriers to Supporting Sustainable Air Travel



Most participants reported flying either 2-3 times (40 %) or once (31 %) per year. Only a minority (1 %) took more than 10 flights annually. Regarding sustainability consciousness, the majority (45 %) considered themselves slightly aware (2-Aware), and a similar distribution was seen for WTP, which was most often slightly willing, followed by moderately willing (see Graphic 3.5).

Graphic 3.5: WTP for Environmentally Friendly Flights



The best-known sustainability measures were carbon offset programs, fuel-efficient aircraft, and reduced emission flight routes. Most participants would pay more for Sustainable Aviation Fuels (SAFs), electric, hybrid, and fuel-efficient aircraft.

The visualisations not presented in this section can be found in Appendix F. Deviations between demographic groups have been identified using slicers in Power BI and will be further discussed with the t- and ANOVA tests in the following section.

3.2.2 Inferential Analysis

While the descriptive examination outlined general trends, this section examines whether these patterns differ significantly across key demographic and behavioural groups. Using SPSS and non-parametric tests, the author identifies meaningful variations in travel frequency, sustainability awareness, and WTP based on demographic characteristics. Due to the multiple-choice format of the questions on motivations and constraints, statistical testing was inappropriate for those variables. Instead, the responses were transformed into ordinal levels and only studied during SEM and cluster analysis. Regional differences were similarly excluded from inferential testing due to the many categories. However, descriptive comparisons for these variables are included in this section to highlight broader trends.

Independent samples t-tests examined potential significant statistical differences between two independent groups within demographic variables (e.g., identified gender), where appropriate. To be able to do this, the "Other" group for gender was sometimes discarded for the investigation. In addition, One-Way ANOVA analyses determined if notable disparities existed across more than two demographic categories. For non-parametric data or in cases where normal distribution could not be assumed, Kruskal-Wallis tests assessed differences in responses concerning frequency, awareness, and WTP. When these tests indicated significant results, Mann-Whitney U tests were conducted as post-hoc analyses to pinpoint where the specific group variances occurred.

The following paragraphs highlight the differences of demographic groups from the overall sample and within themselves when tested in SPSS. If groups are not mentioned, there has not been a deviation.

Motivations

Non-binary individuals are primarily encouraged to endorse airlines focusing on sustainability (21 %), followed by a general commitment to eco-friendly travel. However, safeguarding the planet for future generations (14 %) is less compelling for them.

Minimising noise pollution (20 %) is the top motivator among minors, whereas environmental preservation and lowering carbon emissions matter less. For individuals aged 60 to 69, enhanced air quality (6 %) is not as influential as it is for the broader population.

US citizens prefer protecting the environment for future generations and ensuring cleaner air over cutting carbon emissions (16 %). Meanwhile, participants from India are most influenced by improved air quality, lower emissions, and reduced noise levels (17 %). The Dutch prioritise air quality (24 %), while ethical travel choices (5 %) are less of a driving force. Brazilians are highly motivated by advancements in green technology (21 %), yet reduced noise pollution (5 %) is the least compelling factor. Iranians find better air quality the most persuasive, alongside noise reduction (19 %), but they are less concerned with carbon emissions (13 %). Similarly, Pakistanis emphasise noise reduction (27 %) and ethical travel practices, placing less importance on environmental preservation for future generations (18 %).

Self-employed individuals prioritise investments in innovative green technologies (21 %) over efforts to reduce carbon emissions (15 %). The unemployed are particularly motivated by environmental conservation (29 %), cleaner air, and noise reduction, while carbon footprint cutback (14 %) is not as compelling.

For individuals whose highest level of education is an apprenticeship, technological advancements in eco-friendly travel (21 %) are a stronger motivator than carbon reduction.

In the €4,000-4,999 income bracket, environmental preservation (24 %) and air quality were more compelling motivators than carbon reduction. Among upper-middle earners, such as those making €6,000 to €6,999, cleaner air (20 %) is the most significant factor, while future environmental protection does not play such an important role. Those in the higher-middle income range find ethical and responsible travel choices (25 %) the most compelling, while reducing carbon emissions (17 %) holds less weight for this group. High earners, including those earning above €10,000, are most driven by investments in sustainable technology (30 %).

Respondents frequently mentioned noise reduction and the preference for sustainable airlines, but they generally ranked these factors as less significant motivators.

Constraints

Females did not differ significantly from the overall sample. However, men rank scepticism about the effectiveness of sustainable practices (13 %) as their third most important constraint. Among non-binary individuals, the difficulty of locating and booking eco-friendly flights is more obstructive than higher costs. The limited availability of such flights (15 %) is less of a barrier for them.

The 40-49-year-olds find difficulty in booking sustainable flights the least restrictive factor. Those aged 50-69 are more sceptical (15 %) than the general population. However, limited availability is less of an obstacle for them.

Germans place scepticism (13 %) in third place as a hindrance, a sentiment shared to a lesser degree by Austrians, Dutch, Brazilians, and British respondents. For the Swiss, scepticism (30 %) is the most restrictive factor. Americans struggle more with a lack of awareness of sustainable options (18 %) than with booking difficulties. The Portuguese find insufficient information on eco-friendly flights (21 %) more obstructive than limited

availability. Similarly, Croatians are more discouraged by a lack of awareness and not as much by supply-related issues (12 %). Brazilians are primarily hindered by prioritising other travel considerations over sustainability (23 %), whereas accessibility concerns (8 %) pose a smaller challenge. Iranians and Pakistanis struggle more with low awareness of sustainable travel, but are less deterred by higher costs.

For the self-employed, booking difficulties present the biggest challenge, followed by scepticism (20 %), while limited availability is less of a deterrent. The unemployed are primarily hindered by a lack of awareness (19 %), with higher costs (14 %) being a lesser concern. Retirees are more constrained by prioritising other travel needs over sustainability (15 %) than the overall study population.

Those earning very low incomes experience more constraints due to a lack of awareness than the overall sample. Furthermore, participants in the lower-middle salary range exhibit slightly more scepticism (14 %). Respondents earning between €4,000 and €4,999 per month identified booking difficulties as the least significant barrier. The ones in the mid-to-upper income range reported higher levels of scepticism (18 %) but were less likely to view limited availability (10 %) as a constraint. Moreover, in the range of €7,000 to €7,999, higher costs rank only third. Those making well above average, including the top earners, are more constrained by insufficient information and strong scepticism (22 %), yet they are less affected by high costs or availability concerns (9 %).

Prioritising other travel needs over sustainability and distrust about the impact of eco-friendly measures were frequently mentioned, but generally had a weaker restrictive effect.

Frequency

Travel frequency was measured using a six-point scale (never, once, 2-3 times, 4-6 times, 7-10 times, more than 10 times a year). Individuals with low to moderate awareness (1-3 Aware) reported travel frequencies similar to the overall sample. However, individuals with high awareness (4-Aware) tend to travel more often, with an increased proportion taking 2-3 trips per year (42 %) and 7-10 (13 %) or more than 10 trips annually (5 %). Nevertheless, this difference was not statistically significant when testing with SPSS.

Regarding WTP more for sustainable flights, the least willing group (1-Willing) includes a higher percentage of frequent travellers (over 10 trips per year) and a lower proportion of those who fly once a year (26 %). Those slightly willing (2-Willing) go on journeys more frequently in the 4-6 per year range, while fewer take only one flight annually (25 %). For moderately willing participants (3-Willing), travel regularity does not significantly differ from the broader population. The most willing tourists, however, are far more likely to take just one voyage per year (54 %) or none at all (14 %), while they fly less often in the 2-10 trips categories. None of them undertake more than 10 journeys annually. Some of those deviations were also found during the SPSS analysis. The Mann-Whitney test confirmed variations between not willing and very willing, slightly willing and moderately willing, slightly willing and very willing, and moderately willing and very willing.

Awareness

Environmental consciousness was measured using four levels: not (1-Aware), slightly (2-Aware), moderately (3-Aware), and very aware (4-Aware). Individuals who travel once or 2-3 times per year reveal no significant disparities when contrasted with the aggregate sample. Among those flying 4-6 times annually, there are fewer individuals with no awareness and more who are slightly aware (53 %). Travellers taking 7-10 flights per year are less likely to be slightly (21 %) but more likely to be moderately or highly aware (17 %). Those who never fly are significantly less represented in the moderately aware category (18 %). Among frequent travellers (more than 10 flights per year), there are notably fewer 2-Aware individuals (17 %) and significantly more with high awareness (33 %). As mentioned before, those differences did not prove to be significant according to SPSS.

Regarding WTP more for sustainable flights, those least willing tend to have a higher proportion of individuals with no awareness (33 %) and fewer who are moderately aware (15 %). For the slightly willing, there are no significant deviations. Those moderately willing have fewer 1-Aware individuals (9 %) and more 3-Aware (39 %). The most willing participants are less represented in the slightly (22 %) and more in the highly aware category (27 %). Some of those deviations were also found during the SPSS analysis. The tests showed variances between not willing and moderately willing, not

willing and very willing, slightly willing and moderately willing, and slightly willing and very willing.

Willingness

Inclination to pay more for sustainable air travel was also assessed using a four-point scale: not (1-Willing), slightly (2-Willing), moderately (3-Willing), and very willing (4-Willing). Respondents unaware of sustainability and eco-friendly air travel options are also more likely to be unwilling to pay extra (25 %) and less likely to be moderately willing (17 %). Those with slight awareness are less frequently very willing (4 %). Moderately aware individuals are less represented in the 1- and 2-Willing but more in the 3-Willing category (52 %). The most aware participants are less often 2- and 3-Willing but more frequently 4-Willing (26 %). These patterns were also reflected in SPSS. When looking at the results, not aware and slightly aware show significant differences when the WTP responses are compared. This is also the case for not aware and moderately aware, not aware and very aware, slightly aware and moderately aware, and slightly aware and very aware.

Regarding travel frequency, no major deviations exist among those who fly 2-3 times per year. Travellers taking one flight annually are less represented in 2-Willing and more in 4-Willing (15 %). Those in the 4-6 flights group are more likely to be slightly (53 %) and less likely to be moderately or highly willing (3 %). Individuals flying 7-10 times yearly are also more often 2-Willing and less frequently 3-Willing (21 %). Non-flyers are underrepresented in slightly and moderately willing, but are more commonly found in highly willing (23 %). Among those flying more than 10 times a year, there is a significant increase in non-willing participants (33 %) and a notable decrease in 2-Willing (17 %). They are more frequently moderately willing, but none fall into the 4-Willing category. This was also partially confirmed by the SPSS results, although not all deviations within the group were statistically significant. There were differences found in travelling once and 2-3 times, once and 4-6 times, and once and 7-10 times a year.

Gender

A larger proportion of women never travel by plane (68 %), while a higher share of men takes more than 10 flights annually (67 %). Overall, women tend to fly less frequently, though the difference is not statistically significant according to SPSS.

Women are more likely to fall into the 2-Willing (59 %) and 3-Willing categories than men, with the difference being pronounced for moderately willing (65 %). However, the significance of this deviation could not be confirmed with SPSS.

In terms of awareness, women are significantly more represented in the 1- to 3-Aware categories but are less likely to be in the highest awareness group (45 %) compared to men. SPSS showed that those variations are not statistically significant.

Age Group

Fewer people in their 50s (4 %) travel once per year compared to the overall sample. In the 7-10 flights per year category, there are fewer younger adults, such as those aged 18-23 (21 %), and more individuals in their 40s and 50s. A higher proportion of younger adults (45 %) and those in their 50s never travel by plane, whereas the opposite is true for people in their mid-to-late 20s (14 %). Those who take more than 10 flights annually are more likely to be between 24 and 49 years old, and these were the only age groups that selected this frequency. Nevertheless, these differences were not accepted after the ANOVA tests.

People in their mid-to-late 20s (43 %) and those in their 50s show a higher proportion of participants unwilling to pay more for sustainable flights. In the very willing category, there is a greater share of those aged 30-39 (35 %) and fewer young adults (16 %). These results, however, were also not found to be statistically significant.

Regarding awareness, the 1-Aware category includes more people in their 30s (26 %) and fewer in the 40-59 age range (3 %). The moderate aware group has a higher share of 24-29-year-olds but fewer younger adults (17 %). In the highly aware category, there are

fewer people under 30 and significantly more in the 40-59 bracket. SPSS could also confirm the latter, while the rest were not statistically significant.

Nationality

Due to the large number of nationalities represented in the survey, a minimum-response threshold was applied. The following results include only those countries with at least five responses per category to ensure meaningful analysis.

The Dutch participants travel significantly more often in the 2-3 times per year category. Germans (54 %) are overrepresented in the once-a-year group, as are Austrians. Among those flying 4-6 times annually, there is a higher proportion of Germans (48 %), US-Americans (27 %), and Austrians (24 %). When limiting the analysis to nationalities with at least five responses per category, only Germans selected the 7-10 times or never categories. The group that travels the most had no results under this filter. However, significantly more Austrians (50 %), Portuguese, and US-Americans chose this option when removing the restriction, while Germans (17 %) were underrepresented compared to the general sample.

For unwilling participants, there are significantly more US-Americans (23 %), and a higher share of Portuguese and British (13 %). The 2-Willing category has significantly more Dutch responses. In the moderately willing group, Germans (51 %) and Indians are overrepresented, while US-Americans (6 %) are underrepresented. Among the most willing, filtered answers show that Germany and Austria evenly share this category at a 50/50 ratio.

Regarding awareness, the 1-Aware category includes more Germans (43 %) and significantly more US-Americans and British respondents (18 %). Austrians and Indians are overrepresented in the moderately aware category compared to the total sample. In the highest awareness group, only Germany and Austria appear, with a 72% to 28% distribution, respectively.

Due to the nature and complexity of this variable, all of those deviations could not be confirmed with SPSS.

Education

Master's degree holders (43 %) are overrepresented in the 2-3 flights per year category. The once-a-year group includes more participants with a Bachelor's or High School diploma (22 %) and fewer with a Master's or PhD (5 %). In the 4-6 times category, there are more Bachelor's graduates and fewer High School alumni (13 %). A significantly higher proportion of PhD holders (21 %) and those with an apprenticeship or other education travel 7-10 times per year, while Bachelor's and High School graduates (10 %) are underrepresented in this category. Among those who never fly, there is a significantly higher share of High School (36 %) and Bachelor's degree holders, whereas Master's graduates (9 %) are notably less represented. Only individuals with a Bachelor's or Master's degree travel more than 10 times per year, making up 67% and 33% of this group, respectively. The difference between Master's and High School degree holders was statistically significant for this group.

Moreover, fewer Master's graduates (21 %) are unwilling to pay more, while PhD holders are more represented in this group. Survey takers with an apprenticeship make up twice the share in 1-Willing compared to the total sample. The moderately willing category has more Bachelor's graduates (42 %) and fewer PhD holders (6 %). In the most willing group, there are significantly more PhD holders (16 %), a higher share of Master's graduates, but significantly fewer Bachelor's alumni. The deviations in this group were not accepted after the SPSS analysis.

In addition, the least aware category has a higher proportion of High School graduates (23 %) and fewer individuals with a PhD (4 %). In the moderately aware group, there are more Master's and apprenticeship alumni, while secondary school graduates (12 %) are less prevalent. PhD recipients (16 %) are significantly concentrated in the highest awareness category, alongside a high proportion of Master's graduates. Conversely, High School (8 %) and Bachelor's alumni are comparatively scarce in this group. The difference between PhD and High School degree recipients also proved to be statistically significant for this aspect. The other variations are not accepted.

Occupation

Unemployed participants (1 %) are less prominent in the 2-3 flights annually category. In the once-a-year group, students (57 %) are overrepresented, while self-employed and unemployed individuals (1 %) are less common. More employed (47 %) and unemployed individuals travel 4-6 times yearly, whereas students and retirees (1 %) are underrepresented in this group. The 7-10 times per year category has a greater share of self-employed, employed, and unemployed respondents, while students are less visible. Among those who never travel by plane, there is a significantly higher concentration of self-employed and unemployed individuals, as well as more students (55 %), while employed people (32 %) are comparatively scarce. Self-employed individuals (17 %) travel significantly more often in the 10+ times annually category, whereas employed survey takers are less prevalent in this group. The deviations did not prove to be significant during the analysis with SPSS.

Respondents unwilling to pay more for sustainable air travel are more often employed (46 %) and less self-employed (2 %). In the 2-Willing category, the "Other" group has a higher share, while the unemployed (1 %) are underrepresented. Students (55 %) and jobless individuals are more commonly found in the moderately willing group, while self-employed individuals (2 %) are less prevalent. Among those most willing to pay, self-employed and unemployed make up a notably higher share, and employed participants (46 %) also choose this option more frequently. However, students are significantly less represented in this category. The deviations in this group were not accepted after the analysis with SPSS.

In terms of awareness, students (59 %) are overrepresented in the least aware group, and the unemployed (36 %) make up twice the share in this category compared to the total sample. Employed and retired respondents are less frequently present in this group. The 2-Aware category has more students (54 %) and fewer unemployed (1 %). Students and those in the "Other" category (2 %) are underrepresented in the moderately aware group, while employed participants (45 %) are more prominent. In the highest awareness category, significantly more self-employed and employed (50 %) individuals are present, while students are notably less common. In the latter group, the difference between self-

employed and students proved to be significant. All the variations in the other categories have not been substantial.

Income

Travel frequency varied across income groups with several notable patterns. Respondents in lower and middle salary brackets (27 %) most commonly travelled once per year. In contrast, the 4-6 flights per year group included fewer participants from low-income (9 %) and high-income brackets (3 %), while mid-to-upper earners were overrepresented. The 7-10 flights per year group saw higher participation from those in the €3,000-3,999 range (21 %) and other mid-to-high earners, while people with lower incomes (14 %) were underrepresented. Among those who never travelled by plane, there was a greater proportion of low earners (36 %), mid-range earners, and some upper-middle-income individuals. Those with lower-middle incomes (5 %) were less common. The highest travel frequency category, more than 10 flights annually, was dominated by high earners (33 %) but also included some from low and middle-income groups. People with lower-middle salaries (17 %) were underrepresented in this group. The deviations in this section are only partially significant. People earning above €10.000 differ greatly from those making €0-2.999 and €4.000-4.999 a month. SPSS proved this via t- and ANOVA tests. The other deviations were not significant.

Participants unwilling to pay more for sustainable aviation include significantly more high earners, as well as some very low (31 %) and upper-middle-income individuals. However, those in the €500-999 bracket (5 %) do not follow this trend. The slightly willing category has a higher share of respondents earning above €10,000 per month. Moreover, the most willing tend to fall into middle to upper-income categories (24 %), while lower earners (16 %) are underrepresented. The deviations in this group were not accepted after the analysis with SPSS.

Among the least aware, there is a significantly higher proportion of participants earning below €500 per month (30 %). The second awareness category also includes more lower-income individuals and fewer mid-earners (7 %). Respondents with very low salaries (15 %) are less common in the moderate awareness group, while mid to upper incomes are overrepresented. Among the most aware, survey takers earning between €2,000-2,999 (16

%) and those in middle to high-income brackets are more common, while individuals in the lowest income groups (3 %) are comparatively scarce. The highest and lowest earners showed a significant statistical difference, as confirmed by SPSS via t- and ANOVA tests. The rest of the deviations were not accepted.

3.2.3 Structural Equation Modelling (SEM)

A structural equation model (SEM) was developed to better understand the complex interplay of factors influencing WTP. This approach allows for the simultaneous examination of direct and indirect relationships among motivations, constraints, awareness, travel frequency, and WTP. Including these variables in the SEM analysis required transforming them into levels. This means that the more drivers or barriers the participants selected, the higher the level.

The SEM with the best fit was one where motivation levels, constraint levels, and frequency of air travel all influenced WTP directly. Moreover, encouragements and hindrances also affected each other. In addition, sustainability awareness served as a mediator between those three variables and WTP. The results of the SEM analysis showed a covariance between the level of incentives and that of obstacles at 0.16, which suggests a positive moderate relationship. This is in line with its correlation of 0.42. In other words, the constraint level usually increases when the motivation level increases. When looking at the direct effect of incentive level on WTP, a strong positive effect can be observed. In other words, if participants selected more drivers, their WTP also increased by 0.34 per checked box. The same was true for motivations and eco-friendly awareness, but with a more moderate effect.

Barrier levels had a moderate negative effect on WTP, meaning an increase in hindering factors leads to a decrease in WTP by 0.11. This is in line with its influence on sustainability awareness, however, with a stronger effect.

The frequency of air travel had a moderate positive effect on awareness and a moderate adverse effect on WTP. This means that an increase in air travel leads to an increase in environmental consciousness, but also a decrease in WTP.

Sustainability awareness had a moderate positive influence on inclination to purchase. Consequently, when eco-awareness increases, WTP also increases by 0.22.

On average, participants selected 1.82 motivations and 1.70 constraints. Regarding frequency, they travelled at a level of 2.92, which means that most people travel between once and 2-3 times a year, with the latter being more pronounced.

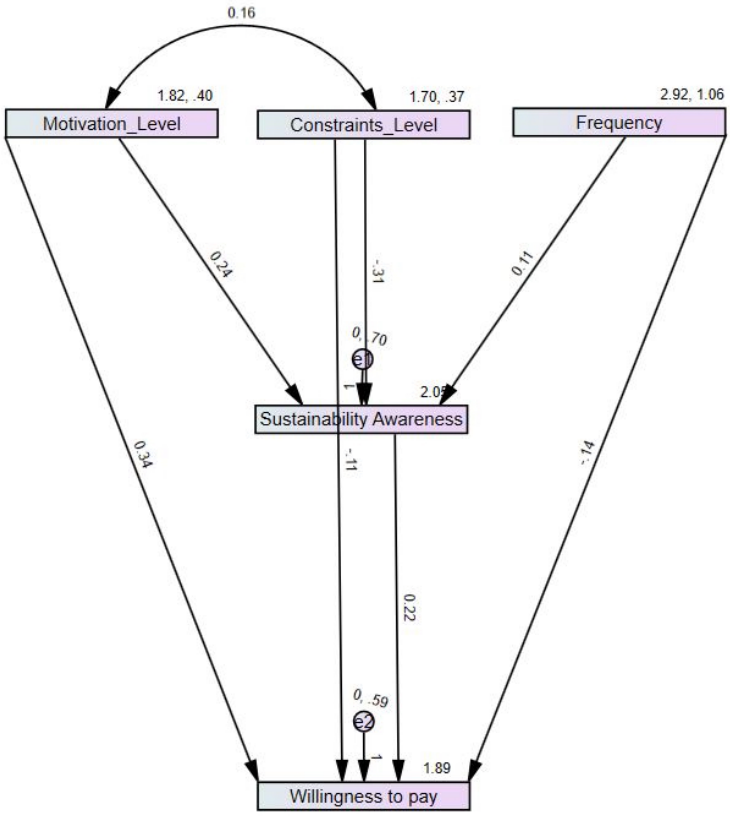
Regarding variance, motivation level, constraint level, and frequency of air travel deviate from the mean by 0.40, 0.37, and 1.06, respectively. This means that responses for the first two are relatively consistent, meaning most people have similar motivation and constraint levels, with few extreme answers. When looking at the latter, there is more variability in how often people travel. Some travel frequently, while others rarely do.

The intercept represents the baseline value of a dependent variable when all predictors in the model are set to zero. On a scale from 1 to 4, the intercept values suggest that, on average, participants reported a low-to-slight level of sustainability awareness (M = 2.05) and WTP (M = 1.89), indicating that while consciousness is slightly higher, payment intent is relatively low.

It must be noted that sustainability awareness and WTP have high error terms (0.7 & 0.59), meaning that the model does not explain a significant portion of those variables. This limitation should be further investigated and corrected by doing additional research. Furthermore, artificially creating levels out of selected motivations and constraints restricts this article, since selecting more or fewer of those boxes does not necessarily mean higher or lower motivation for sustainable air travel. Those restrictions should be further researched, and the questions and answer possibilities should be adjusted.

The visual representation of the SEM can be seen in Graphic 3.6 (own work in AMOS).

Graphic 3.6: Most Fitting SEM Model



3.2.4 Cluster Analysis

To uncover distinct traveller profiles and support more targeted sustainability marketing efforts, a cluster analysis focused on participants' WTP for sustainable air travel. This variable served as the primary basis for grouping, as it directly informs how airlines and other stakeholders can tailor their strategies. While the clusters were created around WTP, they also reflect differences in motivation, perceived constraints, awareness levels, travel behaviour, and demographic traits. The analysis revealed four distinct groups, each representing a consumer segment with varying attitudes and behaviours toward sustainable aviation:

Cluster 1: Low Willingness to Pay

Individuals in this cluster are marked by the lowest WTP and are also associated with low motivation, constraint, and sustainability awareness. Individuals in this group tend to travel 2-3 times per year and show no significant gender differences. Demographically,

they are mostly aged 18-23 or 50-59, predominantly Germans, US-Americans, and Austrians. They typically hold a Bachelor's, Master's, or High School degree, are either students or employed, and earn below €500 or between €1,000 and €1,999 per month.

Cluster 2: Slight Willingness to Pay

Members of this group show a marginally higher WTP than Cluster 1, along with increased motivation and the highest level of constraint. Sustainability awareness is slightly higher than in the first group. They also travel 2-3 times per year, and women are more prevalent in this segment. Most are 18-39 years old, and primarily Germans, Austrians, or US-Americans, holding Bachelor's, Master's, or High School degrees. Like Cluster 1, the majority are students or employed, with monthly earnings ranging from under €500 to €1,999.

Cluster 3: Moderate Willingness to Pay

Defined by moderate WTP, this cluster features the second-highest motivation, constraint, and sustainability awareness. These individuals travel less frequently than other clusters, typically between once and 2-3 times per year. There is a clear gender split, with 65% female and 35% male. Most are aged 18-39 and include Germans, Austrians, and Indians. Like the other two clusters, they are holders of Bachelor's, Master's, or High School degrees. The majority are students or employed, with students being more prominent. Income is typically between €500 and €1,999 per month.

Cluster 4: High Willingness to Pay

This group shows the highest WTP, with the highest motivation and awareness, but the second lowest constraint level. Their travel behaviour spans once to 2-3 times per year, with a higher incidence of one single trip annually. The group is slightly more female-dominated and mainly consists of 18-39-year-olds, particularly Austrians, Germans, and US-Americans, followed by British, Swiss, Portuguese, and Malaysians. Education levels are high, with many holding a Master's, Bachelor's, or PhD. They are mostly employed or students, but also include self-employed and unemployed individuals. Income levels are more diverse, including below €500, €1,000-1,999, €2,000-2,999, or even €4,000-5,999 per month, with the third group being the most dominant.

To provide a clearer comparison of the identified segments, Table 3.1 summarises the main characteristics of each group based on WTP. The clusters differ not only in their level of WTP but also in motivation, constraint, sustainability awareness, travel frequency, and key demographic factors.

Table 3.1: Characteristics of Clusters

Characteristic	Cluster 1: Low WTP	Cluster 2: Slight WTP	Cluster 3: Moderate WTP	Cluster 4: High WTP
Motivation Level	Low	Second lowest	Second highest	Highest
Constraint Level	Low	Highest	Second highest	Second lowest
Sustainability Awareness	Low	Second lowest	Second highest	Highest
Travel Frequency	2-3 times per year	2-3 times per year	1-3 times per year	1-3 times per year
Gender	No significant difference	More female	65% female, 35% male	Slightly more female
Age	18-23 & 50-59	18-39	18-39	18-39
Nationality	Germans, US-Americans, Austrians	Germans, Austrians, US-Americans	Germans, Austrians, Indians	Austrians, Germans, US-Americans, British, Swiss, Portuguese, Malaysians
Education	Bachelor, Master, or High School	Bachelor, Master, or High School	Bachelor, Master, or High School	Master, Bachelor, or PhD
Employment	Students or Employed	Students or Employed	Mostly Students	Employed, Students, Self-/Unemployed
Income	< €500 or €1,000-€1,999	< €500-€1,999	€500-€1,999	<€500, €1,000-2,999, or €4,000-5,999

3.3 Discussion

This section interprets the study's key findings in light of the research questions and existing literature. It aims to synthesise the results into actionable insights while acknowledging methodological limitations. The discussion also outlines practical implications for policymakers, the aviation industry, and future research, thereby translating data into broader strategic relevance.

One of the central aims of this study was to examine the motivations and constraints that influence passengers' willingness to support and pay more for sustainable air travel (RQ1). On the one hand, the analysis revealed that carbon footprint reduction, environmental preservation, and air quality were the most encouraging aspects for participants. On the other hand, higher costs, limited awareness, and difficulty in finding

and booking sustainable flights severely hinder respondents. A higher motivation is often accompanied by a higher constraint level, as shown in the SEM-Analysis. In exploring how sustainability knowledge and travel frequency relate to WTP (RQ2), it became evident that higher awareness levels positively influence payment inclination. Nevertheless, frequent fliers show greater consciousness but are less inclined to purchase. This is in line with the cognitive dissonance and habituation effects discovered by some authors (Cocolas et al., 2020; Cohen et al., 2011; Higham & Cohen, 2011). The SEM illustrated that awareness also mediates the relationship between motivations, constraints, and frequency with WTP. The inclusion of demographic factors (RQ3) further enriches these findings. Younger participants tend to be more willing to pay for sustainable aviation. Furthermore, education level and employment correlate with awareness and willingness. Interestingly, gender did not significantly differ in terms of WTP, awareness, and frequency. While descriptive trends suggested certain demographic patterns, such as women being more represented in the moderate WTP category, most of these differences were not statistically significant. This underscores the need for more nuanced, inclusive data collection and analysis approaches to better capture the complexity of passenger behaviour across socio-demographic backgrounds. Additionally, excluding "other" gender identities in inferential tests highlights a methodological gap that future research should address. Expanding sample sizes and employing gender-sensitive analysis techniques are essential for drawing more equitable and representative conclusions.

While the study offers a comprehensive understanding of passenger attitudes toward sustainable aviation, its results should be interpreted in light of certain methodological limitations. Due to the use of snowball sampling and online distribution, the generalisability of the findings is constrained. Moreover, as the data were self-reported, responses may be subject to social desirability bias, meaning participants could have overstated their environmental awareness or WTP to align with socially acceptable norms. As mentioned, motivations and constraints were transformed into numerical "levels", which may oversimplify psychological variables and might not reflect the actual extent of support/hindrance. In addition, some questions lacked neutral response options and had to be excluded from the analysis. Due to the study's cross-sectional nature, causal relationships between variables, such as awareness and WTP, cannot be established, as the data represent a single point in time. Given the study's exploratory nature and the

number of statistical tests performed, there is a possibility of increased Type I error, which should be considered when interpreting individual test results. Furthermore, multivariate assumptions such as multicollinearity and outlier influence were not formally tested, and response consistency was not assessed, which may limit the robustness of certain statistical findings. All of those limitations should be addressed during future research.

Building on the study's findings, several practical implications emerge for policymakers, industry stakeholders, and future research. For example, authorities are encouraged to introduce awareness campaigns to boost motivation and WTP. Furthermore, targeted incentives like subsidies or loyalty programs could reduce financial constraints for lower-income passengers and lead to higher adoption of sustainable air travel. It is also important to recognise that frequent flyers are aware but not more willing, suggesting the need for regulatory or behavioural nudges. Based on the cluster profiles, airlines are advised to segment customers according to their WTP and tailor their messaging accordingly. Campaigns ought to focus on well-educated, mid-income travellers between 18 and 39 years old who typically fly one to three times annually. In addition, industry participants are urged to improve the availability and visibility of green options in their booking systems. For passenger segments with high sustainability awareness but low WTP (e.g., frequent flyers), non-price incentives such as public recognition or eco-badges may serve as effective strategies to foster engagement. The author also emphasises the importance of investing in customer-facing education on SAFs and electric aircraft, among others.

As already mentioned, this paper faced some limitations that should be addressed using further research. Therefore, scholars should employ longitudinal or experimental designs to establish the missing causal links. Moreover, exploring the cognitive dissonance that especially appeared among frequent flyers is essential. Thereby, a key question that emerges is why increased awareness does not consistently translate into sustainable action. Further, researchers should develop more nuanced awareness, willingness, motivation, and constraint scales and include qualitative dimensions. Another avenue would be replicating the structural model and cluster profiles in other passenger populations to confirm generalisability and robustness. Lastly, future research is

encouraged to focus on investigating the impact of messaging, framing, and trust in sustainability claims on passenger choices.

In sum, this study contributes to a more nuanced understanding of passenger behaviour in sustainable aviation and highlights the complex balance between motivation, awareness, and action. Future research and practice can play a critical role in accelerating the shift toward a more sustainable air travel sector by addressing the identified gaps.

Chapter 4. CONCLUSION

This dissertation aimed to examine the multifaceted challenge of achieving sustainability in air travel, particularly within the tourism sector. To address this, two complementary studies were developed: a systematic review of the academic landscape using PRISMA 2020 methodology, and a quantitative empirical analysis of passenger motivations, constraints, and willingness to pay (WTP) for sustainable aviation. Together, these two papers provide a comprehensive and behaviourally informed perspective on the state of eco-friendly air travel and the key barriers preventing its wider adoption.

The first article revealed that sustainable aviation only began receiving consistent scholarly attention in the years following 2017, with a notable surge in 2020. While early literature emphasised behavioural aspects, more recent studies have shifted toward technological and policy-oriented solutions. Despite this evolution, interest in demand-side measures and consumer awareness is once again growing. The findings highlight several dominant themes, including passenger behaviour, emissions policy, and SAF adoption, and point to methodological diversification in recent years. However, the field remains heavily Western-centric and dominated by a small cluster of recurring authors and journals, which may restrict theoretical diversity. Calls for more interdisciplinary collaboration, regional inclusivity, and value-based behavioural research were frequent among reviewed sources.

The second paper complemented these insights by investigating actual passenger behaviour through survey data. It found that environmental concerns, particularly carbon emissions and intergenerational responsibility, strongly motivate support for sustainable aviation. Nonetheless, high costs, low awareness, and booking complexity remain key deterrents to adoption. The study confirmed that sustainability awareness positively affects WTP, but frequent flyers, despite being more aware, are less likely to act, revealing cognitive dissonance. Demographic factors like age and education had some influence, while gender did not yield statistically significant differences. The analysis also identified specific passenger clusters and proposed actionable strategies for communication and policy tailored to different segments.

From a practical standpoint, these results offer several valuable contributions. For policymakers, the findings reinforce the need for behaviourally informed strategies to complement structural interventions such as SAF mandates or carbon pricing. Campaigns must align with personal values and emotional engagement to overcome psychological inertia. For airlines and tourism companies, the research highlights the importance of better integrating sustainable options into booking systems, adopting value-based messaging, and leveraging non-price incentives like eco-badges or public recognition.

Theoretically, the dissertation advances the academic conversation by linking literature-based trends with empirical evidence. It confirms that structural solutions alone are insufficient without corresponding shifts in consumer attitudes and behaviour. Furthermore, it contributes a nuanced model integrating awareness, motivation, constraint, and frequency as key determinants of WTP. Both studies point to the urgency of interdisciplinary approaches that unite behavioural science, tourism studies, environmental psychology, and public policy.

However, the work is not without limitations. The systematic review, while methodologically rigorous, was limited to English-language articles and excluded engineering-focused literature, which may have omitted important perspectives. The empirical study relied on snowball sampling and self-reported data, introducing possible biases such as social desirability effects and limited generalisability. Additionally, the use of cross-sectional data restricts causal inference, and the transformation of psychological factors into simplified numerical levels may underrepresent the depth of human behaviour. Gender analysis was limited by sample constraints, and inferential analysis excluded non-binary responses, a shortcoming that future studies should correct.

These limitations suggest several directions for future research. Scholars should replicate the study across more diverse populations and cultural contexts, especially in underrepresented regions like Latin America, Africa, and Southeast Asia. Longitudinal or experimental research is needed to investigate causality and change over time. There is also a pressing need to understand cognitive dissonance better among frequent travellers, particularly why greater awareness does not always lead to more sustainable behaviour. Further exploration of psychological factors such as values, identity, trust in

sustainability claims, and framing effects in communication campaigns is warranted. Lastly, the literature would benefit from a deeper investigation into institutional behaviour, including how airlines and tourism operators make strategic sustainability decisions.

In conclusion, this dissertation affirms that the path to sustainable aviation lies not only in technological advancement or regulatory enforcement but also in the integration of these efforts with behavioural insight. By bringing together a systematic analysis of academic discourse and an empirical understanding of passenger attitudes, this work offers both a theoretical and practical contribution. The challenge ahead lies in bridging the gap between knowledge and action, between what passengers know and what they choose to do. To that end, the findings presented here offer an evidence-based foundation for more effective, equitable, and emotionally resonant approaches to greening the skies.

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Annexes

Annex A: PRISMA Checklist

PRISMA 2020 Checklist

Section and Topic	Item	Checklist item	Included
TITLE			
Title	1	Identify the report as a systematic review.	Yes
ABSTRACT			
Abstract	2	See the PRISMA 2020 for Abstracts checklist.	Yes
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	Yes
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	Yes
METHODS			
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	Yes
Information sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.	Yes
Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.	Yes
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	Yes
Data collection process	9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process.	Yes
Data items	10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.	Yes
	10b	List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.	Yes
Study risk of bias assessment	11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.	Yes

Section and Topic	Item	Checklist item	Included
Effect measures	12	Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results.	Yes
Synthesis methods	13a	Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5)).	Yes
	13b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions.	Yes
	13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses.	Yes
	13d	Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.	Yes
	13e	Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression).	Yes
	13f	Describe any sensitivity analyses conducted to assess robustness of the synthesized results.	Yes
Reporting bias assessment	14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).	Yes
Certainty assessment	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.	Yes
RESULTS			
Study selection	16a	Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram.	Yes
	16b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.	Yes
Study characteristics	17	Cite each included study and present its characteristics.	Yes
Risk of bias in studies	18	Present assessments of risk of bias for each included study.	Yes
Results of individual studies	19	For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots.	Yes
Results of syntheses	20a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.	Yes
	20b	Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.	Yes
	20c	Present results of all investigations of possible causes of heterogeneity among study results.	Yes
	20d	Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results.	Yes
Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.	Yes

Section and Topic	Item	Checklist item	Included
Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	Yes
DISCUSSION			
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	Yes
	23b	Discuss any limitations of the evidence included in the review.	Yes
	23c	Discuss any limitations of the review processes used.	Yes
	23d	Discuss implications of the results for practice, policy, and future research.	Yes
OTHER INFORMATION			
Registration and protocol	24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered.	Yes
	24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	Yes
	24c	Describe and explain any amendments to information provided at registration or in the protocol.	Yes
Support	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.	Yes
Competing interests	26	Declare any competing interests of review authors.	Yes
Availability of data, code and other materials	27	Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.	Yes

From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. doi: 10.1136/bmj.n71

PRISMA 2020 for Abstracts

Section and Topic	Item	Checklist item	Included
TITLE			
Title	1	Identify the report as a systematic review.	Yes
BACKGROUND			
Objectives	2	Provide an explicit statement of the main objective(s) or question(s) the review addresses.	Yes
METHODS			
Eligibility criteria	3	Specify the inclusion and exclusion criteria for the review.	Yes
Information sources	4	Specify the information sources (e.g. databases, registers) used to identify studies and the date when each was last searched.	Yes
Risk of bias	5	Specify the methods used to assess risk of bias in the included studies.	Yes
Synthesis of results	6	Specify the methods used to present and synthesise results.	Yes
RESULTS			
Included studies	7	Give the total number of included studies and participants and summarise relevant characteristics of studies.	Yes
Synthesis of results	8	Present results for main outcomes, preferably indicating the number of included studies and participants for each. If meta-analysis was done, report the summary estimate and confidence/credible interval. If comparing groups, indicate the direction of the effect (i.e. which group is favoured).	Yes
DISCUSSION			
Limitations of evidence	9	Provide a brief summary of the limitations of the evidence included in the review (e.g. study risk of bias, inconsistency and imprecision).	Yes
Interpretation	10	Provide a general interpretation of the results and important implications.	Yes
OTHER			
Funding	11	Specify the primary source of funding for the review.	Yes
Registration	12	Provide the register name and registration number.	Yes

From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. doi: 10.1136/bmj.n71

Annex B: CASP Review Template

CASP Checklist:

For Descriptive/Cross-Sectional Studies

Paper Title:	
Author:	
Web Link:	
Appraisal Date:	

During critical appraisal, never make assumptions about what the researchers have done. If it is not possible to tell, use the "Can't tell" response box. If you can't tell, at best it means the researchers have not been explicit or transparent, but at worst it could mean the researchers have not undertaken a particular task or process. Once you've finished the critical appraisal, if there are a large number of "Can't tell" responses, consider whether the findings of the study are trustworthy and interpret the results with caution.

Checklist	
1. Are the research question/aim/objectives clearly defined?	☐ Yes ☐ No ☐ Can't Tell
CONSIDER: ***For Empirical Studies:*** • *Is the specific population or context addressed?* • *What initiatives or issues are being explored?* • *Are the expected outcomes clearly defined?* • *How well do the findings integrate with existing literature on sustainable aviation, and do they identify gaps or propose future directions?* ***For Theoretical Studies:*** • *Is the theoretical framework clearly articulated?* • *What key themes are identified?* • *Are the objectives aimed at addressing gaps in theoretical frameworks?* • *Does the article discuss the practical implications of the theoretical insights?* • *Are future research directions proposed based on the theoretical findings?*	
2. Did the authors use an appropriate method to answer their question?	☐ Yes ☐ No ☐ Can't Tell
CONSIDER: • *Do the methods align with the research objectives?* • *Are the data collection tools and analysis methods valid and reliable for the study's context?* • *Is the chosen research design suitable for the type of question being addressed (e.g., exploratory, descriptive, causal)?* • *Is the sample size adequate, and is the selection method appropriate for the research context?* • *Are ethical issues appropriately addressed, especially concerning participants or environmental considerations?* • *Are the methods described clearly and transparently, allowing for replication of the study?*	
3. Were the subjects or sources of information recruited or selected in a manner that is appropriate and acceptable for the study's context?	☐ Yes ☐ No ☐ Can't Tell
CONSIDER: ***For Empirical Studies:*** • *What recruitment method was employed, and is it suitable for the research objectives?* • *Is the sample size sufficient for reliability and validity?* • *Are the participants representative of the target population?* • *Does the sample reflect demographic diversity?* • *Were ethical standards upheld, including informed consent?* ***For Theoretical Studies:*** • *How were the theoretical frameworks or literature sources selected?* • *Were clear criteria established for inclusion or exclusion of sources?* • *Does the review encompass diverse perspectives and disciplines?* • *Are the sources current and relevant to the discourse?* • *Is there transparency in the selection process, providing a rationale for included sources?*	
4. Were the measures accurately measured to reduce bias?	☐ Yes ☐ No ☐ Can't Tell
CONSIDER: ***For Empirical Studies:*** • *Are the measures valid and reliable for their intended purpose?* • *Were standardized measures used, or was a rigorous process followed for custom measures?* • *What techniques were employed to reduce bias in measurement?* • *Was a pilot test conducted, and what adjustments were made based on the pilot findings?* • *Are the measures understandable and accessible to the participants?* ***For Theoretical Studies:*** • *Are key concepts and theories clearly defined and operationalized?* • *Does the literature review include a comprehensive and balanced representation of measures?* • *Are existing measures critically evaluated for validity and reliability?* • *Do the authors identify potential biases in the literature and their implications?*	

• *Are recommendations made for improving measurement accuracy in future research?*	
5. Were the data collected in a way that addressed the research issue?	☐ Yes ☐ No ☐ Can't Tell
CONSIDER: ***For Empirical Studies:*** • *Is there a clear alignment between the data collection methods and the research objectives?* • *Are the chosen data collection methods appropriate for answering the research question?* • *What sampling strategy was used, and was it suitable for the target population?* ***For Theoretical Studies:*** • *Is the scope of the literature review aligned with the research issue?* • *Are high-quality, relevant sources assessed and integrated into the discussion?*	
6. Did the study try to minimize the play of chance?	☐ Yes ☐ No ☐ Can't Tell
CONSIDER: ***For Empirical Studies:*** • *Was randomization used to assign participants, reducing potential bias?* • *Was the sample size calculated to ensure the study had adequate power to detect effects?* • *Were blinding techniques (single or double) applied to reduce bias and chance effects?* • *Were adjustments made for multiple comparisons to control Type I errors?* • *Did the authors use replication or cross-validation to confirm the consistency of results?* ***For Theoretical Studies:*** • *Was a diverse range of high-quality sources reviewed to reduce selective bias?* • *Did the study critically evaluate sources to avoid overreliance on chance findings?* • *Were assumptions and theoretical scope clearly defined to limit interpretive biases?* • *Did the authors explore sensitivity analyses to test the robustness of theoretical claims?* • *Was there alignment or comparison with existing literature to confirm theoretical consistency?*	
7. Did the authors choose the right theoretical basis?	☐ Yes ☐ No ☐ Can't Tell
CONSIDER: ***For Empirical Studies:*** • *Did the authors select studies that are directly relevant to the research question and objectives?* • *Are the chosen articles recent and reflect the current understanding in the field?* • *Is there a good balance of primary research and foundational studies to support the study's design and methodology?* • *Are the sources from reputable, peer-reviewed journals, ensuring reliability?* ***For Theoretical Studies:*** • *Have the authors included a comprehensive range of high-quality, foundational sources relevant to the topic?* • *Did they critically assess and integrate alternative perspectives to provide a balanced view?* • *Are key theoretical developments and influential studies included to establish a solid conceptual framework?* • *Do the chosen articles reflect a depth of analysis, covering both historical and contemporary insights?* • *Is the scope of the literature appropriately broad to capture the complexity of the theoretical issue being examined?*	
8. How are the results presented and what is the main result?	☐ Yes ☐ No ☐ Can't Tell
CONSIDER: ***For Empirical Studies:*** • *Are the results presented clearly and logically, with each finding linked to the research question?* • *Are visual aids, like tables or graphs, used effectively to enhance clarity?* • *Is the main result or finding clearly emphasized, making it easy to identify?* • *Are statistical results reported with appropriate measures (e.g., p-values, confidence intervals) to convey significance?* • *Are any unexpected results or limitations transparently discussed to provide context?* ***For Theoretical Studies:*** • *Is the main argument or theoretical conclusion highlighted and clearly stated?* • *Are supporting arguments or sub-findings presented logically and cohesively?*	

- *Does the presentation of results show a critical synthesis of literature rather than just summarizing sources?*
- *Are theoretical insights or new frameworks clearly distinguished as the primary contribution of the study?*
- *Is the conclusion well-supported by the reviewed literature, showing a clear link back to the research question?*

9. Was the data analysis sufficiently rigorous? ☐ Yes ☐ No ☐ Can't Tell

CONSIDER:

For Empirical Studies:

- *Were appropriate and advanced statistical methods used to ensure thorough data analysis?*
- *Was the choice of data analysis technique justified and aligned with the research questions?*
- *Did the authors check for assumptions (e.g., normality, homogeneity) relevant to their statistical methods?*
- *Was data cleaning and preprocessing (e.g., handling of missing data) described and conducted rigorously?*
- *Were robustness checks, such as sensitivity analyses, conducted to validate the findings?*

For Theoretical Studies:

- *Was the literature reviewed comprehensively, with a critical evaluation of key sources and concepts?*
- *Did the authors apply a structured and systematic approach to analyse the theoretical content?*
- *Were theoretical arguments critically examined for coherence, consistency, and relevance to the research question?*
- *Was the analysis free from confirmation bias, considering multiple perspectives or counterarguments?*
- *Did the study provide depth in its theoretical interpretation, showing analytical rigor beyond surface-level review?*

10. How valuable is the research? ☐ Yes ☐ No ☐ Can't Tell

CONSIDER:

For Empirical Studies:

- *Does the study address a significant gap or pressing question in the field?*
- *Are the findings generalizable or applicable to real-world contexts?*
- *Does the research have potential implications for policy, practice, or future research?*
- *Were limitations addressed, and did the study suggest areas for further investigation?*
- *Does the study provide new insights, data, or methodologies that add value to the field?*

For Theoretical Studies:

- *Does the research advance understanding of key concepts or frameworks in the field?*
- *Are the theoretical contributions original, offering new perspectives or clarifying existing debates?*
- *Does the study critically challenge or refine established theories?*
- *Are there implications for future theoretical development or practical applications?*
- *Is the research valuable for guiding empirical studies, and laying a foundation for new investigations?*

From: Critical Appraisal Skills Programme (2024)

Appendices

Appendix A: List of Selected Articles

Appendix Table 1: List of Selected Articles Included in the Literature Review

ID	Name of Article	Authors	Year of Publication
1	Binge flying – behavioural addiction and climate change	Cohen et al.	2011
2	Canary in the coalmine: Norwegian attitudes towards climate change and extreme long-haul air travel to Aotearoa/New Zealand	Higham & Cohen	2011
3	Identity and tourism mobility: an exploration of the attitude–behaviour gap	Hibbert et al.	2013
4	Sociological barriers to developing sustainable discretionary air travel behaviour	Cohen et al.	2014
5	Climate change, discretionary air travel, and the "flyers' dilemma"	Higham et al.	2014
6	Climate change, tourist air travel and radical emissions reduction	Higham et al.	2016
7	'Green' on the ground but not in the air: pro-environmental attitudes are related to household behaviours but not discretionary air travel	Alcock et al.	2017
8	The power of persuasive communication to influence sustainable holiday choices: appealing to self-benefits and norms	Hardeman et al.	2017
9	The role of values for voluntary reductions of holiday air travel	Büchs	2017
10	Does carbon pricing reduce air travel? Evidence from the Australian 'Clean T Energy Future' policy, July 2012 to June 2014	Markham et al.	2018
11	Estimating willingness to pay air passenger duty	Seetaram et al.	2018
12	Nudging the jetset to offset: voluntary carbon offsetting and the limits to nudging	Tyers	2018
13	Can we fly less? Evaluating the 'necessity' of air travel	Gössling et al.	2019
14	An electric airplane: assessing the effect of travelers' perceived risk, attitude, T and new product knowledge	Han et al.	2019
15	Green hub-and-spoke network design for aviation industry	Parsa et al.	2019
16	Envisioning future travel: moving from high to low carbon systems	Fletcher et al.	2019
17	The global scale, distribution and growth of aviation: implications for climate change	Gössling & Humpe	2020
18	Does 'flight shame' affect social norms? Changing perspectives on the desirability of air travel in Germany	Gössling et al.	2020
19	Managing tourism emissions through optimizing the tourism demand mix: concept and analysis	Sun et al.	2020
20	Willingness to pay for sustainable aviation depends on ticket price, greenhouse gas reductions and gender	Rice et al.	2020
21	Consumer attitudes towards flying amidst growing climate concern	Cocolas et al.	2020
22	Flying in the face of climate change: quantitative psychological approach examining the social drivers of individual air travel	Oswald & Ernst	2020
23	Green aviation industry sustainable development towards an integrated support system	Qiu et al.	2021

24	The development of 'green' airports: which factors influence willingness to pay for sustainability and intention to act? A structural and mediation model analysis	Winter et al.	2021
25	Impact of political and market-based measures on aviation emissions and passenger behaviours (a Swiss case study)	Wild et al.	2021
26	The anchoring effect of aviation green tax for sustainable tourism, based on the nudge theory	Kim & Hyun	2021
27	Climate action at international airports: an analysis of the airport carbon accreditation programme	Dube	2021
28	Emotions and caring mediate the relationship between knowledge of sustainability and willingness to pay for greener aviation	Ragbir et al.	2021
29	Strategies to mitigate carbon emissions for sustainable aviation: a critical review from a life-cycle perspective	Hu et al.	2022
30	Reconfiguring aviation for a climate-safe future: are airlines sending the wrong message?	Higham et al.	2022
31	The rich kids of Instagram: luxury travel, transport modes, and desire	Cohen et al.	2022
32	Air passengers' preferences for aviation voluntary carbon offsetting: a co-benefits perspective	Zhang et al.	2022
33	Sustainable commercial aviation: what determines air travellers' willingness to pay more for sustainable aviation fuel?	Xu et al.	2022
34	Purchase intention toward green airlines and willingness to pay more: extending the theory of planned behaviour	Akan et al.	2022
35	Global tourism, climate change and energy sustainability: assessing carbon reduction mitigating measures from the aviation industry	Leal Filho et al.	2023
36	Net-zero aviation: time for a new business model?	Gössling & Humpe	2023
37	Life cycle assessment in aviation: a systematic literature review of applications, methodological approaches and challenges	Keiser et al.	2023
38	The choice between business travel and video conferencing after COVID-19 – Insights from a choice experiment among frequent travellers	Müller & Wittmer	2023
39	Aeromasculinities and the fallacy of sustainable aviation	Hopkins et al.	2023
40	"Door-to-door" carbon emission calculation for airlines – Its decarbonization potential and impact	Li & Merkert	2023
41	Baggage dissociation for sustainable air travel: design study of ground baggage distribution networks	Al-Hilfi et al.	2023
42	Air travel and persuasive climate communications	Cocolas et al.	2023
43	The sustainability characteristics of international air routes: a composite index approach	Koo et al.	2023
44	Pathway to zero emissions in global tourism: opportunities, challenges, and implications	Peeters & Papp	2024
45	How airports enhance the environmental sustainability of operations: a critical review from the perspective of Operations Research	Chen et al.	2024
46	Trends and emerging research directions of sustainable aviation: a bibliometric analysis	Dinçer et al.	2024
47	Healthy persuasion: a values-based messaging approach to leisure air travel decision-making	Higham et al.	2024
48	Economic impacts of power-to-liquid fuels in aviation: a general equilibrium analysis of production and utilization in Germany	Mueller et al.	2024

Appendix B

Data Extraction Sheet

Study ID	Title	Authors	Name of Journal	Year of Publication	Organizations
1	Life cycle assessment in aviation: A systematic literature review of applications, methodological approaches and challenges	Dennis Keiser, Lars Henrik Schnoor, Birte Pupkes, Michael Freitag	Journal of Air Transport Management	2023	Bremer Institut fur Produktion und Logistik GmbH, University of Bremen
2	Trends and emerging research directions of sustainable aviation: A bibliometric analysis	Fatma Cande Yasar Dinçer, Gozde Yirmibesoglu, Yasemin Bilisli, Emel Arık, Hakkı Akgun	Heliyon	2024	Akdeniz University, Suleyman Demirel University
3	Baggage dissociation for sustainable air travel: Design study of ground baggage distribution networks	Sarah Al-Hilfi, Hao Yu, Pavel Loskot	Transportation Research Interdisciplinary Perspectives	2023	University of Basrah, The Arctic University of Norway, ZJU-UIUC Institute
4	BINGE FLYING – Behavioural Addiction and Climate Change	Scott Cohen, James Higham, Christina T. Cavaliere	Annals of Tourism Research	2011	Bournemouth University, University of Otago
5	Can we fly less? Evaluating the 'necessity' of air travel	Stefan Gössling, Paul Hanna, James Higham, Scott Cohen, Debbie Hopkins	Journal of Air Transport Management	2019	Western Norway Research Institute, Lund University, Linnaeus University, University of Surrey, University of Otago, University of Oxford
6	Canary in the coalmine: Norwegian attitudes towards climate change and extreme long-haul air travel to Aotearoa/New Zealand	James Higham, Scott Cohen	Tourism Management	2011	University of Otago
7	Climate change, tourist air travel and radical emissions reduction	James Higham, Scott Cohen, Christina T. Cavaliere, Arianne Reis, Wiebke Finkler	Journal of Cleaner Production	2016	University of Otago, University of Surrey, Stockton University, Southern Cross University, University of Stavanger
8	Climate Change, Discretionary Air Travel, and the "Flyers' Dilemma"	James Higham, Scott Cohen, Christina T. Cavaliere	Journal of Travel Research	2014	University of Otago, University of Surrey
9	Does carbon pricing reduce air travel? Evidence from the Australian 'Clean Energy Future' policy, July 2012 to June 2014	Francis Markham, Martin Young, Arianne Reis, James Higham	Journal of Transport Geography	2018	The Australian National University, Southern Cross University, Western Sydney University, University of Otago
10	Envisioning future travel: Moving from high to low carbon systems	Jean Fletcher, Nancy Longnecker, James Higham	Futures	2019	University of Otago, University of Stavanger
11	Green aviation industry sustainable development towards an integrated support system	Rui Qiu, Shuhua Hou, Xin Chen, Zhiyi Meng	Wiley Business Strategy and the Environment	2021	Sichuan University, Nanjing University
12	Healthy persuasion: a values-based messaging approach to leisure air travel decision-making	James Higham, Knut Veisten, Iratxe Landa Mata, Eivind Farstad, Debbie Hopkins, Yi Bian	Journal of Sustainable Tourism	2024	Griffith University, University of Otago, Norwegian Centre for Transport Research, University of Oxford
13	How airports enhance the environmental sustainability of operations: A critical review from the perspective of Operations Research	Shuiwang Chen, Lingxiao Wu, Kam K.H. Ng, Wei Liu, Kun Wang	Transportation Research Part E	2024	The Hong Kong Polytechnic University
14	Managing tourism emissions through optimizing the tourism demand mix: Concept and analysis	Ya-Yen Sun, Pei-Chun Lin, James Higham	Tourism Management	2020	The University of Queensland, National Cheng Kung University, The University of Otago
15	The choice between business travel and video conferencing after COVID-19 – Insights from a choice experiment among frequent travelers	Adrian Muller, Andreas Wittmer	Tourism Management	2023	University of St. Gallen
16	The sustainability characteristics of international air routes: A composite index approach	Tay T.R. Koo, Yi-Lung Chen, Zhenyu Zhang, Kan-Lin Lu, Ruwen Deng, Trent Banfield, Andreas Papatheodorou	Tourism Management	2023	University of New South Wales, Tourism Australia, University of the Aegean
17	The Rich Kids of Instagram: Luxury Travel, Transport Modes, and Desire	Scott Cohen , Hongbo Liu , Paul Hanna, Debbie Hopkins, James Higham,Stefan Gössling	Journal of Travel Research	2022	University of Surrey, University of Oxford, University of Otago, Western Norway Research Institute, Lund University, Linnaeus University
18	"Door-to-door" carbon emission calculation for airlines – Its decarbonization potential and impact	David Changxiong Li, Rico Merkert	Transportation Research Part D	2023	The University of Sydney
19	Economic impacts of power-to-liquid fuels in aviation: A general equilibrium analysis of production and utilization in Germany	Tobias Mueller, Etti Winter, Ulrike Grote	Energy Conversion and Management: X	2024	Leibniz Universität Hannover, Technische Universität Braunschweig
20	Global tourism, climate change and energy sustainability: assessing carbon reduction mitigating measures from the aviation industry	Walter Leal Filho, Artie W. Ng, Ayyoob Sharifi, Jitka Janová, Pınar Gökçin Özuyar, Chinmai Hemani, Graeme Heyes, Dennis Njau, Izabela Rampasso	Sustainability Science	2023	Manchester Metropolitan University, Hamburg University of Applied Sciences, International Business University, University of Waterloo, The Hong Kong Polytechnic University, Hiroshima University, Mendel University in Brno, Bahçeşehir University, RuChiNi ESP, Manchester Metropolitan University Business School, Palme Research and Training Consultants, Universidad Católica del Norte
21	Impact of political and market-based measures on aviation emissions and passenger behaviors (a Swiss case study)	Peter Wild, Florian Mathys, Jing Wang	Transportation Research Interdisciplinary Perspectives	2021	ETH Zurich
22	Nudging the jetset to offset: voluntary carbon offsetting and the limits to nudging	Roger Tyers	Journal of Sustainable Tourism	2018	University of Southampton
23	Pathway to zero emissions in global tourism: opportunities, challenges, and implications	Paul Peeters, Bernadett Papp	Journal of Sustainable Tourism	2024	Breda University of Applied Sciences, NHL Stenden University of Applied Sciences
24	Green hub-and-spoke network design for aviation industry	Mostafa Parsa, Ali Shahandeh Nookabadi, Simme Douwe Flapper, Zümbül Atan	Journal of Cleaner Production	2019	Eindhoven University of Technology, Isfahan University of Technology (IUT)
25	The anchoring effect of aviation green tax for sustainable tourism, based on the nudge theory	Haeok Liz Kim, Sunghyup Sean Hyun	Journal of Sustainable Tourism	2021	Hanyang University
26	'Green' on the ground but not in the air: Pro-environmental attitudes are related to household behaviours but not discretionary air travel	Ian Alcocka, Mathew P. White, Tim Taylor, Deborah F. Coldwell, Matthew O. Gribble, Karl L. Evans, Adam Corner, Sotiris Vardoulakis, Lora E. Fleming	Global Environmental Change	2017	University of Exeter Medical School, University of Sheffield, Emory University Rollins School of Public Health, Climate Outreach, Environmental Change Department
27	Air Passengers' Preferences for Aviation Voluntary Carbon Offsetting: A Co-benefits Perspective	Beile Zhang , Brent W. Ritchie , Judith Mair,Sally Driml	Journal of Travel Research	2022	Nankai University, The University of Queensland
28	An electric airplane: Assessing the effect of travelers' perceived risk, attitude, T and new product knowledge	Heesup Han, Jongsik Yu, Wansoo Kim	Journal of Air Transport Management	2019	Sejong University, Tongwon University, Dong-A University
29	Climate Action at International Airports: An Analysis of the Airport Carbon Accreditation Programme	Kaitano Dube	Springer Nature Switzerland	2021	Vaal University of Technology
30	Aeromasculinities and the fallacy of sustainable aviation	Debbie Hopkins, Stefan Gössling, Scott Cohen, Paul Hanna , James Higham	Energy Research & Social Science	2023	University of Oxford, Linnaeus University, University of Surrey, Hoare Lea, Griffith University
31	Air travel and persuasive climate communications	Nicole Cocolas, Gabrielle Walters, Lisa Ruhanen, James Higham	Journal of Sustainable Tourism	2023	University of Surrey, University of Queensland, Griffith University
32	Consumer attitudes towards flying amidst growing climate concern	Nicole Cocolas, Gabrielle Walters, Lisa Ruhanen, James Higham	Journal of Sustainable Tourism	2020	University of Queensland, University of Otago
33	Does 'flight shame' affect social norms? Changing perspectives on the desirability of air travel in Germany	Stefan Gössling , Andreas Humpe , Thomas Bausch	Journal of Cleaner Production	2020	Lund University, Linnaeus University, Western Norway Research Institute, Munich University of Applied Sciences, Free University Bozen-Bolzano
34	Emotions and caring mediate the relationship between knowledge of sustainability and willingness to pay for greener aviation	Nadine K. Ragbir, Stephen Rice, Scott R. Winter, Elaine C. Choy	Technology in Society	2021	Embry-Riddle Aeronautical University
35	Estimating willingness to pay air passenger duty	Neelu Seetaram, Haiyan Song, Shun Yec , Stephen Page	Annals of Tourism Research	2018	University of Huddersfield, The Hong Kong Polytechnic University, Zhejiang University, University of Hertfordshire
36	Flying in the Face of Climate Change: Quantitative psychological approach examining the social drivers of individual air travel	Lisa Oswald, Andreas Ernst	Journal of Sustainable Tourism	2020	University of Kassel
37	Strategies to Mitigate Carbon Emissions for Sustainable Aviation: A Critical Review From a Life-cycle Perspective	Yu-Jie Hu, Lishan Yang, Hefu Cui, Honglei Wang, Chengjiang Li, Bao-Jun Tang	Sustainable Production and Consumption	2022	Guizhou University, COMAC Beijing Aircraft Technology Research Institute, Key Laboratory of "Internet+" Collaborative Intelligent Manufacturing in Guizhou Provence, Beijing Institute of Technology,
38	Sustainable commercial aviation: What determines air travellers' willingness to pay more for sustainable aviation fuel?	Bing Xua , Salman Ahmad, Vincent Charles, Jin Xuan	Journal of Cleaner Production	2022	Heriot-Watt University, University of the West of Scotland, CENTRUM Catolica Graduate Business School, Pontifical Catholic University of Peru, University of Surrey
39	The development of 'green' airports: Which factors influence willingness to pay for sustainability and intention to act? A structural and mediation model analysis	Scott R. Winter, Sean R. Crouse, Stephen Rice	Technology in Society	2021	Embry-Riddle Aeronautical University
40	Willingness to pay for sustainable aviation depends on ticket price, greenhouse gas reductions and gender	Connor Rice, Nadine K. Ragbir, Stephen Rice, Gina Barcia	Technology in Society	2020	Holy Trinity Episcopal Academy, Embry-Riddle Aeronautical University
41	Identity and tourism mobility: an exploration of the attitude–behaviour gap	Julia F. Hibbert, Janet E. Dickinson, Stefan Gössling, Susanna Curtin	Journal of Sustainable Tourism	2013	Bournemouth University, Linnaeus University, Lund University
42	Net-zero aviation: Time for a new business model?	Stefan Gössling, Andreas Humpe	Journal of Air Transport Management	2023	Western Norway Research Institute, Linnaeus University, Munich University of Applied Sciences
43	Purchase Intention Toward Green Airlines and Willingness to Pay More: Extending the Theory of Planned Behavior	Sahap Akan, Emircan Özdemir, Mahmut Bakır	Springer Nature Singapore	2022	Anadolu University, Eskisehir Technical University, Samsun University
44	Reconfiguring Aviation for a Climate- Safe Future: Are Airlines Sending the Wrong Message?	James Higham, Paul Hanna , Debbie Hopkins, Scott Cohen, Stefan Gössling, Nicole Cocolas	Journal of Travel Research	2022	University of Otago, University of Surrey, University of Oxford, Western Norway Research Institute, Lund University, Linnaeus University, University of Queensland
45	Sociological barriers to developing sustainable discretionary air travel behaviour	Scott Cohen, James Higham, Arianne C. Reis	Journal of Sustainable Tourism	2013	University of Surrey, University of Otago, Southern Cross University
46	The global scale, distribution and growth of aviation: Implications for climate change	Stefan Gössling, Andreas Humpe	Global Environmental Change	2020	Lund University, Western Norway Research Institute , Linnaeus University, Munich University of Applied Sciences
47	The power of persuasive communication to influence sustainable holiday choices: Appealing to self-benefits and norms	Gerben Hardeman, Xavier Font, Jeroen Nawijn	Tourism Management	2017	ANVR, University of Surrey, NHTV Breda University of Applied Sciences
48	The role of values for voluntary reductions of holiday air travel	Milena Büchs	Journal of Sustainable Tourism	2016	University of Southampton

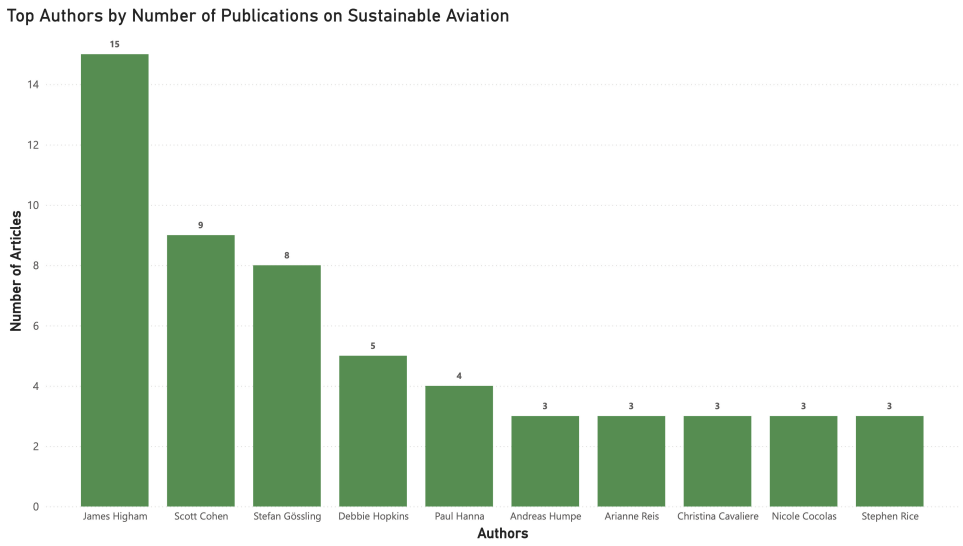
Geographical Distribution	Type of Study	Study Design	Sample Size/ Number of Articles	Keywords	Research Focus
USA, Germany, China, UK, Brazil, Netherlands, Belgium, Greece, Canada, Spain, Italy	Literature Review	Mixed Methods	45	aviation, life cycle assessment, sustainability, review	Operational aspects of Sustainability
USA, China, England, Germany, Australia, Turkey, Canada, Malaysia, Netherlands, India	Bibliometric Analysis	Quantitative	726	aviation, sustainability, sustainable aviation, bibliometric analysis	Trends in Sustainable Aviation
UK	Design and Optimization Study	Quantitative	173	air transport, baggage service, distribution network, travel experience	Operational aspects of Sustainability
Norway, UK	Empirical Qualitative Study	Qualitative	30	behavioural addiction, air travel, climate change, social norms	Behavioral and Social Aspects of Aviation
Sweden	Empirical Exploratory Study	Mixed Methods	987	aviation, climate policy, flight shame, induced demand, Paris Agreement, travel motives	Behavioral and Social Aspects of Aviation
Norway	Empirical Qualitative Study	Qualitative	15	climate change, aviation, CO2 emissions, extreme long-haul travel, Norway, New Zealand	Behavioral and Social Aspects of Aviation
Norway, UK, Germany, Australia	Empirical Qualitative Study	Qualitative	69	emissions, aviation, behaviour change, public health, nudge, social marketing	Behavioral and Social Aspects of Aviation
Norway, UK, Germany	Empirical Qualitative Study	Qualitative	48	climate change, discretionary air travel, "flyers' dilemma", attitudes, behavior change	Behavioral and Social Aspects of Aviation
Australia	Empirical Quantitative Study	Quantitative	135	air travel, aviation carbon pricing, climate change, emissions, Australia	Behavioral and Social Aspects of Aviation
New Zealand, Australia, Canada, USA, Europe, Asia	Empirical Exploratory Study	Mixed Methods	401	future travel, 2050, visions, low carbon mobility, climate change, avoid-shift-improve	Behavioral and Social Aspects of Aviation
Global	Bibliometric Analysis	Quantitative	539	business strategy, environmental policy, green aviation industry, green image, stakeholder engagement, sustainable development	Operational aspects of Sustainability
Norway	Empirical Exploratory Study	Mixed Methods	26	air travel, aviation exceptionalism, public health, healthy persuasion, behaviour change, values-based messaging	Behavioral and Social Aspects of Aviation
Global	Literature Review	Qualitative	111	airport traffic flow management, environmental sustainability, green aviation, operations research	Trends in Sustainable Aviation
Japan, China, Hong Kong, Macao, Singapore, Korea, Malaysia, Indonesia, USA, Canada, UK, France, Germany, Australia	Empirical Quantitative Study	Quantitative	N/A	tourism carbon emissions, mitigation, optimization, eco-efficiency, goal programming, market mix	Operational aspects of Sustainability
Switzerland	Empirical Quantitative Study	Quantitative	245	business travel decision-making, business traveler behavior, face-to-face communication, videoconferencing, COVID-19, adaptive choice-based conjoint analysis (ACBC)	Behavioral and Social Aspects of Aviation
Australia	Empirical Quantitative Study	Quantitative	100	sustainable air travel, air route development, airline yield and emissions, composite index, sustainability indicator, ranking	Operational aspects of Sustainability
UK	Content Analysis	Qualitative	1,883	Instagram, luxury travel, transport modes, signalling, social norms, co-occurrence analysis	Behavioral and Social Aspects of Aviation
Global, UK, USA, Asia-Pacific, Europe	Empirical Exploratory Study	Mixed Methods	383	"door-to-door" carbon emission calculation, airline decarbonisation, net-zero, sustainability, air/ground transport	Operational aspects of Sustainability
Germany	Empirical Quantitative Study	Quantitative	N/A	aviation, power-to-liquid, blending quota, general equilibrium, social accounting matrix, supply chain analysis	Operational aspects of Sustainability
Global	Empirical Exploratory Study	Mixed Methods	772	climate change, tourism business, aviation industry, energy sustainability, paris agreement, self-regulation, international airports	Trends in Sustainable Aviation
Switzerland	Empirical Exploratory Study	Mixed Methods	237	market-based measures, flight tax, Carbon Offset Program, Reduction Scheme for International Aviation, emission trading system, COVID-19, CO2 compensation	Behavioral and Social Aspects of Aviation
UK	Empirical Exploratory Study	Mixed Methods	1,426	air travel, behavioural economics, behavioural insights, carbon offsetting, nudge	Behavioral and Social Aspects of Aviation
Global	Design and Optimization Study	Quantitative	N/A	climate change, zero emissions scenario, risk analysis, aviation, climate justice	Operational aspects of Sustainability
USA	Design and Optimization Study	Quantitative	N/A	green aviation, emission mitigation measure, hub-and-spoke network, multi-objective model, marginal abatement cost	Operational aspects of Sustainability
South Korea	Empirical Quantitative Study	Quantitative	333	nudge theory, anchoring effect, aviation green tax, pro-environmental identity	Behavioral and Social Aspects of Aviation
UK	Empirical Quantitative Study	Quantitative	3,923	pro-environmental behaviour, voluntary air travel, discretionary air travel, climate change concerns, attitude-behaviour consistency, pro-environmental spill-over	Behavioral and Social Aspects of Aviation
Australia	Empirical Quantitative Study	Quantitative	841	aviation VCO projects, VCO co-benefits, consumer preference, preference heterogeneity, discrete choice modeling	Behavioral and Social Aspects of Aviation
USA	Empirical Quantitative Study	Quantitative	321	electric transition, perceived risk, electric airplane, adopt intention, willingness to pay, new product knowledge	Behavioral and Social Aspects of Aviation
Global	Content Analysis	Qualitative	312	climate change, SDG 13, aviation, air ports, green aviation, sustainability	Trends in Sustainable Aviation
Global	Empirical Qualitative Study	Qualitative	14	aeromobilities, sustainable aviation, justice, carbon emissions, masculinities	Operational aspects of Sustainability
Australia	Empirical Quantitative Study	Quantitative	672	air travel, attitudes, persuasion, climate communications, attitude functions	Behavioral and Social Aspects of Aviation
Australia	Empirical Qualitative Study	Qualitative	20	air travel, climate concern, functional theory of attitudes, attitudes, consumer behaviour, COVID-19	Behavioral and Social Aspects of Aviation
Germany	Empirical Quantitative Study	Quantitative	1002	aviation, climate policy, flight shame, Fridays for Future, social norms	Behavioral and Social Aspects of Aviation
United States, China, and Sweden	Empirical Quantitative Study	Quantitative	514	sustainability, green aviation, willingness to pay, mediation, affect	Behavioral and Social Aspects of Aviation
UK	Empirical Quantitative Study	Quantitative	2002	Air Passenger Duty, willingness to pay, contingent valuation method, elasticity, hierarchical linear modelling	Behavioral and Social Aspects of Aviation
Canada, Germany	Empirical Exploratory Study	Quantitative	393	travel, flying, environmental attitude, social identity, social interconnectedness, social media	Behavioral and Social Aspects of Aviation
China, Germany	Bibliometric Analysis	Quantitative	46	aviation, carbon emission reduction, life cycle, text mining, delphi method	Operational aspects of Sustainability
UK	Empirical Quantitative Study	Quantitative	1008	Low Carbon Jet Fuel (LCJF), Sustainable Aviation Fuel (SAF), aviation sector, public perception, willingness to pay, theory of planned behaviour	Behavioral and Social Aspects of Aviation
USA	Empirical Quantitative Study	Quantitative	732	sustainability, green aviation, willingness to pay, structural equation modeling, mediation	Behavioral and Social Aspects of Aviation
Global	Empirical Quantitative Study	Quantitative	1102	aviation sustainability, green airports, green house gases, gender, consumer opinions	Behavioral and Social Aspects of Aviation
UK	Empirical Qualitative Study	Qualitative	24	identity, environmental awareness, behaviour change, tourism mobility	Behavioral and Social Aspects of Aviation
Global	Design and Optimization Study	Quantitative	N/A	aviation, climate change, equality, net-zero, finances, sustainable aviation fuels	Operational aspects of Sustainability
Turkey	Empirical Quantitative Study	Quantitative	150	Theory of planned behavior (TPB), green airline, environmental consciousness, willingness to pay more, partial least squares path modeling	Behavioral and Social Aspects of Aviation
Australia, New Zealand, Qatar, UK	Empirical Qualitative Study	Qualitative	223	sustainable consumption and production, aviation emissions, marketing communications, component substitution, moral disengagement, structural reform	Behavioral and Social Aspects of Aviation
Australia, Norway, UK	Empirical Qualitative Study	Qualitative	90	flying, climate change, attitude-behaviour gap, home and away, identity, behaviour change	Behavioral and Social Aspects of Aviation
Australia, Norway, United Kingdom, USA, Germany, Taiwan, Sweden	Empirical Quantitative Study	Quantitative	N/A	aviation, climate policy, CORSIA, emission equity, emission gap, Paris Agreement	Operational aspects of Sustainability
The Netherlands	Empirical Quantitative Study	Quantitative	324	normative appeals, descriptive norms, injunctive norms, benefits, individualism, collective self	Behavioral and Social Aspects of Aviation
UK	Empirical Qualitative Study	Qualitative	52	air travel, behavioural studies, climate change, sustainable tourism, tourist motivation, values	Behavioral and Social Aspects of Aviation

Reported Outcomes	Notes
The review analyzed the application of Life Cycle Assessment (LCA) in aviation, focusing on methodological approaches and challenges. The study highlighted that LCA is increasingly used to evaluate environmental impacts across areas such as energy-efficient aircraft design, sustainable production, flight and ground operation optimization, and alternative energy sources. However, significant research gaps exist, particularly in underexplored life cycle stages like decommissioning and recycling. The review identified methodological inconsistencies, such as variations in functional units and system boundaries, which hinder comparability across studies. Despite a rise in LCA publications, the majority focus on specific phases (e.g., cradle-to-gate) rather than the full life cycle. Geographically, research is concentrated in Europe and North America. The review concludes with a proposed framework to standardize LCA methodologies, improve data quality, and enhance the comparability of studies within the aviation sector.	
The bibliometric analysis examined trends and emerging research directions in sustainable aviation between 2001 and 2023 using 726 studies indexed in the Web of Science. The analysis revealed that most publications appeared between 2020 and 2023, with a focus on "engineering" and "energy fuels" as primary research areas. The International Journal of Sustainable Aviation Fuel was the most productive source, and Heyne emerged as the most prolific and highly connected author. Keyword co-occurrence analysis identified "sustainable aviation fuel" as the most frequently used term, reflecting a significant focus on alternative fuels for mitigating aviation's environmental impacts. Citation analysis found the U.S.A. as the most influential country, with the Chinese Academy of Sciences recognized as the most cited organization. The study also highlighted evolving themes, shifting toward more complex, technology-oriented research topics in recent years. These findings provide a foundation for guiding future research and policy directions in sustainable aviation.	
The study presents a design for baggage ground distribution networks to facilitate baggage dissociation in air travel. Two scenarios were analyzed: Greater London and the entire UK. In the Greater London scenario, the region was divided into 173 grid cells (5.5 km x 5.5 km), and it was determined that 36 Baggage Sorting Centers (BSCs) could achieve full service coverage, with nearly 100% demand coverage. Optimization models like the Maximal Covering Location Problem (MCLP) and p-median problem were used to balance service accessibility and travel distances. The MCLP ensured even distribution of BSCs, while the p-median approach minimized average travel distances for densely populated areas. In the UK-wide scenario, the country was divided into 310 grid cells (36 km x 36 km). It was found that 30–35 BSCs could achieve 90–100% service coverage, depending on the assumed maximum coverage distance. Shared BSCs were identified as a cost-efficient strategy, especially for airports in close proximity. For example, Cell 44 was optimal for serving all six London airports, while other BSCs could simultaneously serve neighboring airports like Newquay and Exeter. The results highlight the feasibility of baggage dissociation, with optimal network design contributing to infrastructure efficiency and sustainability in aviation.	Sample size are the grid cells that Greater London & UK is divided into, it's not a real sample size
The authors examined the concept of "binge flying" as a behavioral addiction, linking frequent tourist air travel to cognitive dissonance between personal gratification and climate impact awareness. Interviews from Norway and the UK revealed a growing negative discourse around excessive air travel, with participants employing guilt suppression and denial to reconcile these tensions. The study highlights shifting social norms, stigmatizing frequent flying and fostering a "carbon conscience" that may reshape tourism practices. It suggests alternatives like "slow tourism" and staycations to reduce reliance on air travel. Ultimately, the study frames holiday flying as a potential behavioral addiction, urging sustainable reforms in tourism and travel industries.	
The study examined the flight patterns and perceptions of 29 international students at Lund University over a six-year period (2012–2017). It found significant variation in flight frequency and distance, with students averaging 75,413 km each. Leisure was the most common travel motive (40%), followed by visits to friends and relatives (23%) and education (14%). While most flights were deemed important (58%), 21% were considered of limited or no importance, suggesting unnecessary travel. Longer flights were generally rated as more important, particularly for significant personal or professional reasons. Students often chose air travel for cost reasons but acknowledged alternatives like trains or buses. The study highlights the subjective nature of flight importance and suggests that not all air travel is essential, with implications for sustainable transport and climate policy.	
This study explores Norwegian attitudes towards climate change and its impact on air travel, particularly long-haul flights to New Zealand. While participants demonstrated widespread concern about climate change and acknowledged human contributions to it, they also expressed a reluctance to significantly alter their travel behaviors. Long-haul trips to New Zealand were viewed as extraordinary, often justifying environmental concerns due to their infrequent nature. Despite awareness of air travel's impact, many participants showed an "air travel with a carbon conscience" attitude, such as opting for longer stays or multiple destinations to reduce the frequency of travel. The study highlights a gap between climate change awareness and the willingness to reduce air travel, with many still prioritizing travel desires over environmental concerns.	
This article explores the effectiveness of voluntary, soft (bottom-up), and hard (top-down) regulatory approaches to reducing air travel emissions, emphasizing the need for strong government intervention. It finds that voluntary measures, like carbon offsetting, are largely ineffective due to consumer skepticism and the shifting of responsibility away from the airline industry and government. While soft approaches can raise awareness, significant behavior change requires multifaceted structural interventions, such as carbon taxes and travel subsidies, supported by transparent legislation. Public receptiveness to regulatory measures varies by country, with Norwegians more willing to accept strong interventions, while participants in the UK, Germany, and Australia show resistance, particularly over perceived restrictions on personal freedom. The study concludes that hard regulatory measures are likely more effective at reducing air travel emissions, but political and industry resistance poses significant barriers. Lessons from public health policy suggest that progressive regulation can be effective, despite opposition from the aviation industry, which may resist such measures through lobbying and other tactics. The article stresses the urgent need for structural policy changes to achieve meaningful emissions reductions in the aviation sector.	
This study highlights both convergence and divergence in attitudes toward climate change and air travel across three European societies (Norway, the UK, and Germany). While there is widespread climate concern, it is often overshadowed by factors such as convenience, cost, and lifestyle in shaping travel decisions. Despite awareness of air travel's environmental impact, participants were generally reluctant to change their behaviors, with national differences in views on responsibility for climate action. The study concludes that behavioral change in air travel will not occur spontaneously and requires policy interventions and infrastructure changes. It also suggests that addressing air travel practices will need to consider the specific socio-cultural contexts of each society.	
The study found that the introduction of the carbon price in Australia, ranging from \$23.00 AUD to \$24.15 AUD per tonne, had no statistically significant impact on reducing per capita domestic air travel. Despite testing various models, including those accounting for airline capacity and other factors, the carbon pricing measure did not influence the amount of air travel, as shown by the lack of significant association in the models tested. External shocks such as industrial action and airline collapses had lasting effects on air travel, but the carbon pricing policy did not effectively alter travel behavior.	
This study explored young adults' expectations for travel in 2050 and their alignment with low-carbon mobility systems. While 91% of participants anticipated travel would change, only 48% envisioned a transition to low-carbon mobility, largely through technological improvements (e.g., alternative fuels) rather than behavioral shifts like reducing travel or adopting new transport modes. However, 55% mentioned expectations that could reinforce high-carbon mobility, including faster travel, greater convenience, and increased affordability. The reliance on technology without curbing travel demand may hinder climate targets, as expectations like commercial space travel and increased air travel pose sustainability challenges. To facilitate a shift, structural changes in infrastructure, policies, and incentives are necessary to align convenience and speed with low-carbon solutions.	
This article explores the key elements necessary for the sustainable development of the green aviation industry, emphasizing the importance of innovation and sustainability. It evaluates the current status of the industry, highlighting the need for technological advancements, such as efficient aircraft and fuel alternatives, and the role of business strategies in reducing environmental impacts. The article stresses the integration of innovation, policy support, and public participation in creating an effective system for sustainable aviation. It suggests that governments, airlines, and the public must collaborate to foster a green aviation industry through technological innovation, strategic improvements, and environmental policies, ensuring long-term sustainability.	
The study highlights the complex mix of support and opposition towards reducing leisure air travel, revealing that attitudes are influenced by deep values such as individualism, collectivism, and environmental concerns. It identifies three groups—supporters, persuadables, and opponents—and shows that values-based messaging (VBM) focusing on positive, values-driven appeals (e.g., protecting the environment, social justice, and family time) can effectively influence persuadables towards more sustainable travel choices. The study suggests that VBM should avoid guilt or myth-busting, and instead promote practical solutions like improved rail networks and sustainable alternatives, while also addressing the practical concerns of cost and convenience.	
This paper provides a comprehensive review of the application of Operations Research (OR) in addressing environmental concerns in airport traffic flow management problems (ATFMPs). It identifies trends and evolution in key areas such as gate assignment, pushback control, taxi planning, tow vehicle operations, runway scheduling, and aircraft trajectory optimization, with a particular focus on environmental goals like pollution reduction and noise abatement. The study shows that environmental considerations are typically integrated into optimization models through explicit objectives (e.g., minimizing fuel consumption and emissions) or implicit goals (e.g., minimizing taxi distance). Methodologies are primarily based on various OR models, with nonlinear programming (NLP) being most common in gate assignment, trajectory optimization, and integrated models, while mixed-integer linear programming (MILP) dominates in tow vehicle operations and runway scheduling. The research also highlights the limited incorporation of uncertainty in most models, with pushback control being the exception. The paper concludes by noting that, despite substantial progress, further efforts are needed to enhance modeling approaches, algorithms, and the handling of uncertainty in ATFMPs.	
The study's optimization analysis reveals several key outcomes regarding tourism demand management in Taiwan. The analysis suggests that a 5% reduction in overall visitor numbers across all segments could achieve a similar reduction in tourism-related carbon emissions. More targeted approaches, such as focusing on visitor segments with low carbon intensity and longer stays (e.g., Indonesia and Malaysia), further reduce emissions while improving social aspects like seasonality and visitor balance throughout the year. In contrast, prioritizing carbon reduction, as seen in Scenario 3A, leads to a 10.2% decrease in emissions but results in a significant loss in tourism expenditure and mixed social outcomes. Scenario 3B, which balances economic goals with carbon reduction, reduces emissions by 5% but worsens seasonality and reduces the average length of stay. Scenario 4 demonstrates that focusing on demand-driven environmental initiatives, such as increasing Australian visitor numbers while reducing Hong Kong/Macau arrivals, can achieve the highest carbon reduction (5.3%) with minimal negative effects on visitor expenditure and seasonality. Overall, the results highlight the complex trade-offs between economic, environmental, and social goals when optimizing tourism demand.	
The study explores the decision-making process of business travelers when choosing between face-to-face (FtF) meetings and virtual communication (VC) after COVID-19, revealing that meeting purpose, message complexity, and location are key factors influencing preferences. Negotiations, complex or formal messages, and creative tasks strongly favor FtF meetings, while technical exchanges and less complex interactions are often conducted virtually. The results indicate a shift towards reduced business travel for internal meetings and recurring appointments, suggesting potential cost and carbon emission savings. However, cultural factors and trust-building requirements still drive significant demand for FtF communication in certain contexts, particularly for external stakeholders and meetings in regions like Asia.	
The main outcomes of the study include the development of a novel composite index for assessing the sustainability of air routes to and from Australia, integrating factors such as emissions, tourism expenditure, regional dispersal, yield, and volume. The study identifies four distinct route clusters, each with different sustainability characteristics, providing valuable insights for stakeholders. It emphasizes the need for targeted support for Cluster 1 routes (high tourism and environmental performance) and the decarbonization of Cluster 2 routes, which are high in emissions. The research also highlights the importance of government involvement in addressing market failures and balancing tourism benefits with environmental impact. Lastly, it suggests future research should include airline-level sustainability indicators to capture the broader impacts of the aviation network.	
The study reveals how the "Rich Kids of Instagram" (ROKI) use luxury transport modes, including sports cars, luxury SUVs, yachts, and private planes, to craft their self-image on social media. The analysis highlights gender-based differences in the types of transport and associated attributes: men often showcase cars, power, and masculinity, while women focus on luxury experiences like yachts, nature, and femininity. Transport modes are linked to displays of wealth, comfort, and status, with commercial and private planes emphasizing luxury travel experiences, and yachts and helicopters tied to iconic destinations. Additionally, ROKI employ postures, objects, and texts (e.g., humblebragging) to reinforce their elite status.	
The main outcomes of the study highlight that incorporating "door-to-door" (D2D) carbon emission calculations, which include ground transport emissions, is a significant opportunity for the airline industry to reduce its overall carbon footprint. The study found that ground transport emissions can contribute up to 22% of total emissions for short-haul flights and 4.7% for long-haul flights, emphasizing the potential for immediate and cost-effective decarbonization strategies. Additionally, the study suggests that small-scale interventions, like cabin-to-lounge conversion and improved sustainability reporting, can support airlines in meeting their climate targets and influence consumer behavior, while advocating for a broader approach to decarbonizing the entire aviation value chain.	
This study analyzes the economic impacts of introducing Power-to-Liquid (PtL) fuels in aviation, focusing on both production and utilization perspectives. The findings reveal that low PtL blending quotas moderately affect aviation prices and demand, but higher quotas lead to significant economic shifts, benefiting some sectors while harming others. The introduction of PtL fuels causes a decrease in GDP, with a larger impact from subsidies, but the overall effect remains modest in relative terms. The study highlights the importance of supportive policies, such as subsidies and fossil fuel taxation, to mitigate negative effects. Further research is needed to explore passenger behavior, import routes, and cross-sectoral impacts for a more comprehensive understanding.	
The study reveals that the tourism industry, particularly air travel, significantly contributes to CO_2 emissions, with a strong emphasis on sustainability in both environmental and economic aspects. Bibliometric analysis highlighted key research themes like emissions, ecological footprint, and climate change mitigation, while the multiple-case analysis of 20 major airlines found that over half committed to a 50% reduction in CO_2 emissions by 2050. Key strategies included enhancing operational efficiency, adopting Sustainable Aviation Fuel (SAF), and addressing infrastructure gaps, especially in emerging economies where SAF delivery infrastructure is lacking. These findings highlight the critical need for sustainable practices and infrastructure development in the aviation sector.	
The study found that COVID-19 significantly reduced air travel, with average monthly flights dropping from 2.34 to 0.59 during the pandemic and only partially recovering to 1.99 post-pandemic. Virtual meetings, environmental concerns, and health risks were key factors in reduced travel. Although 60% of participants supported environmental taxes, only 27% felt these taxes would alter their travel behavior, with most willing to pay higher flight taxes if revenues were invested in sustainable aviation technologies. Voluntary compensation for emissions was favored, but awareness of sustainable fuel options was low. Booking behavior also influenced support for environmental measures, with those booking flights themselves being more supportive than those relying on internal agencies. Overall, travel habits are expected to remain below pre-pandemic levels due to ongoing shifts in behavior and preferences.	
The study found that nudging interventions, including social norms, third-party endorsements, and affective messaging, failed to significantly influence interest in or actual behavior of purchasing carbon offsets in both RCT1 and RCT2. Focus groups revealed potential design flaws and substantive barriers, such as skepticism about offset accountability, perceived irrelevance of individual actions, and costs of offsets. Additionally, social norm nudges were viewed as having the most potential if redesigned, incorporating peer influence and clearer communication. Overall, offset behavior was driven more by individual climate concern and travel group size rather than the interventions themselves.	
The main outcome of the study is that a Zero Emissions Tourism (ZET) scenario can maintain tourism numbers, guest-nights, and revenues at Business-As-Usual (BAU) levels, but only if travel distances do not increase significantly by mid-century. The study highlights the climate inequities in tourism, where high and middle-income countries contribute the most to CO_2 emissions, while developing nations, which rely on long-haul tourism, face the greatest climate risks. The ZET scenario proposes fairer distribution of airlift capacity and sustainable aviation fuel (SAF) blending mandates as solutions to address these imbalances.	
The main results of the article demonstrate that the proposed multi-objective optimization model, which incorporates fleet composition, emissions, noise pollution, and fuel consumption, can cost-effectively reduce CO_2 emissions in the domestic US aviation sector by up to 10% and 8% at jet fuel prices of \$3.1 and \$2.0 per gallon, respectively, compared to the classical model. The model's solutions, derived through multiple methods including the ε-constraint and weighted sum approaches, offer significant potential for sustainability in aviation. Additionally, the study highlights the economic and environmental benefits of adopting this new measure in the context of future sustainability targets for aviation.	
The study found that pro-environmental self-identity (PESI) positively influences green perceived value (GPV), action for climate change (ACC), and climate change risk perception (CCRP). ACC significantly affects attitudes toward green policies (AGP), which in turn impacts travelers' willingness to pay (WTP) for environmental protection in aviation. However, the relationships between GPV, CCRP, and AGP were not significant. Additionally, materialism and hedonism were found to moderate certain relationships, with materialism affecting the relationship between GPV and AGP, and hedonism affecting the relationship between ACC and AGP. The moderating effects of materialism and hedonism were not consistently supported across all hypotheses.	
The study found limited support for the "pro-environmental consistency" hypothesis, which suggests that pro-environmental attitudes and climate concerns are associated with reduced discretionary flight behavior. In both the CCTC and BHPS datasets, higher pro-environmental attitudes and climate concern were initially linked to a lower likelihood of being a 'non-flyer' (abstaining from discretionary flights), but these relationships became non-significant when adjusting for other variables. Furthermore, pro-environmental attitudes and climate concern showed no significant effect on the flight distance among 'flyers.' Socio-demographic factors, such as age, income, and household structure, were more strongly associated with flight behaviors. Additionally, pro-environmental attitudes were consistently related to pro-environmental household behaviors, highlighting a divergence between household and flight behaviors.	
The study investigates the preferences for aviation voluntary carbon offset (VCO) programs among Australian air passengers, focusing on their willingness to pay for various co-benefits, such as biodiversity and health. The results show that respondents favor VCO programs with high environmental and socioeconomic co-benefits, certified programs, and domestic flight options. The analysis reveals significant heterogeneity in preferences, with some passengers highly valuing biodiversity and health benefits, while others are more sensitive to certification and costs. These findings highlight the potential for tailoring VCO offerings to different passenger segments.	
The study's results revealed significant relationships between various factors influencing the adoption of electric airplanes. Perceived risk had a negative impact on both attitude and trust toward electric airplanes, while new product knowledge positively influenced both attitude and trust. Attitude was a positive predictor of trust and adoption intention, while trust strongly predicted both adoption intention and the willingness to pay conventional flight prices. The model explained 85.4% of the variance in adoption intention and 64.3% in willingness to pay. Trust and new product knowledge had the greatest total effects on adoption intention and willingness to pay, while perceived risk had the largest negative impact. Additionally, attitude and trust acted as significant mediators in the relationships between the research variables.	
The main outcomes of the study highlight that the Airport Carbon Accreditation (ACA) programme has successfully engaged airports globally in addressing climate change by reducing carbon emissions. The programme has gained significant traction, especially in Europe, and has led to increased participation in higher accreditation levels, benefiting both the aviation sector and non-aviation actors through offset projects. However, the study calls for more supportive mechanisms from policymakers to encourage wider participation, particularly in less engaged regions, and emphasizes the need for more academic research on how the aviation industry is mitigating climate change.	
The study identifies key findings regarding how airlines present and implement sustainability in aviation. Airlines often frame their sustainability efforts around awareness of their carbon footprint, commitment to science-based targets, and growth in alignment with carbon neutrality. They emphasize the adoption of technologies like sustainable aviation fuels (SAFs) and fleet renewal as central strategies for achieving net-zero emissions. However, the study reveals contradictions in their approaches, such as promoting growth while claiming environmental responsibility, and shifting responsibility to governments or customers. Additionally, airlines use discourses of social justice to justify their expansion and continued growth, positioning aviation as a necessary service for global mobility.	
The study found that advertisements with central arguments generally led to greater attitude change (both cognitive and affective) than those with peripheral cues. Respondents with higher climate concern and objective knowledge showed stronger cognitive and affective responses to the advertisements, particularly in the utilitarian central condition. The most dominant attitude function associated with air travel was value-expressive, which also correlated with higher climate concern. However, the study did not find evidence that matching persuasive messages with respondents' attitude functions led to greater attitude change. Furthermore, individuals with high climate concern had stronger cognitive and affective reactions across all conditions, supporting the idea that greater involvement in the subject matter enhances attitude change.	
The main findings of this study highlight that air travel is deeply ingrained in social practices and is perceived as essential for achieving desirable experiences, with climate concerns being downplayed due to entrenched motivations. The study identified that attitudes towards air travel serve multiple functions—utilitarian, social-adjustive, value-expressive, and ego-defense—often reinforcing the perceived necessity of flying. Despite an awareness of climate change, travelers resist adjusting their behaviors, as flying is intertwined with social norms and personal values. The research suggests that addressing these ingrained attitudes through targeted messaging and promoting more sustainable travel options can help shift consumer perspectives on air travel.	
The analysis shows that a quarter of respondents (27.6%) had not flown in 2018, a lower proportion than in similar surveys. Most respondents (26.5%) flew once, while 19.9% flew twice. A significant share (11%) of the sample accounted for nearly 30% of all flights. The study found that flight activity varied by education,	
The study found that both general knowledge of sustainability and specific knowledge of aviation sustainability significantly influenced individuals' willingness to pay (WTP) for more sustainable aviation practices. Caring and happiness were identified as key emotional mediators in this relationship, with both emotions playing a crucial role in explaining why participants were willing to pay more for sustainable options. The findings underscore the importance of emotional connections, particularly caring about sustainability and feeling happy about its potential, in driving consumer support for sustainable practices in aviation.	
The study found that a large proportion of respondents (74-78%) were willing to pay the Air Passenger Duty (APD), with willingness increasing for longer and higher-class trips. Business class passengers had a higher mean willingness to pay (MWTP) than economy class across all trip lengths. Factors influencing willingness to pay included flight class, travel distance, and socio-demographic traits such as age, employment, and travel experience. The demand for APD was found to be inelastic at lower price points but became elastic as the price increased. Respondents preferred a fixed charge per ticket and favored spending APD on environmental projects, though few linked APD directly to carbon offsetting.	
The study found that participants reported an average of 11,844 km traveled by plane in the past year, with a significant portion of flights for leisure and work/education. Those who had studied abroad exhibited higher global social interconnectedness (GSIS), which was linked to more international travel and greater expression of cosmopolitan identity (CIS). The analysis revealed three distinct traveler groups: "cosmopolitans," "mainstream," and "settled," with varying travel patterns and psychological attitudes. Structural equation modeling indicated that environmental attitudes, perceived dilemmas about flying, social media use, and cosmopolitan identity significantly influenced travel behaviors, with GSIS playing a role in VFR travel and flight distances. Furthermore, factors such as financial barriers and openness to alternative travel modes affected travel decisions.	
This study identifies key factors influencing carbon emissions in the aviation industry, highlighting demand, technological advancements, and alternative fuels as the most significant drivers. The research provides a timeline of low-carbon technologies for sustainable aviation, with policy implications focusing on improving aircraft efficiency, optimizing air traffic management, and promoting alternative fuels. In the short term, policies like carbon taxes and air traffic optimization are crucial, while in the long term, technological advancements, especially in alternative fuels and aircraft design, will be vital for achieving emissions reduction goals. The study also emphasizes the importance of aircraft recycling and disassembly technologies for sustainability.	
This study highlights that while there is general support for low-carbon jet fuel (LCJF) due to its potential environmental, economic, and energy security benefits, concerns about its supply and competition with food crops are prominent. It reveals that although LCJF is seen as a promising solution for reducing aviation emissions, many respondents remain unsure whether it is the most effective approach, suggesting that more information and education are needed to encourage broader acceptance and adoption of this technology.	
The study found that perceptions of climate change, affect, and value positively influenced participants' willingness to pay for sustainable initiatives at airports. Willingness to pay also mediated the relationship between climate change perceptions and the intention to act against climate change. Additionally, the future time perspective and value were found to have a significant positive relationship with the intention to act, even though the relationship between future time perspective and willingness to pay was not supported. The final model explained 42% of the variance in willingness to pay and 66% in the intention to act.	
In both studies, participants were more willing to pay higher ticket prices for flights with greater reductions in greenhouse gas emissions. As the level of emission reduction increased, participants' willingness to pay the additional cost also increased. However, this willingness was lower when the ticket price increase was higher (10% or 15%). In Study 1, females were generally more willing to pay than males, with this gender difference becoming more pronounced as the reduction in emissions increased. In Study 2, while the results were similar, gender differences were not significant, indicating that the higher ticket price for international flights may have mitigated the gender effect.	
The study reveals that identity plays a significant role in influencing tourism mobility decisions. It highlights three key mechanisms: (1) VFR (Visiting Friends and Relatives) travel, which affirms personal relationships and creates a "safety blanket" for more adventurous travel; (2) possible selves, where future identity projections drive travel behavior; and (3) the construction of self-narratives, where individuals use tourism experiences to shape and present their identities. The findings suggest that sustainable travel behavior is difficult to achieve because identities often override factors like environmental concerns, cost, and time. Policymakers and marketers should consider identity issues and explore ways to promote positive, sustainable identities while addressing the social pressures tied to travel.	
The study finds that under different scenarios, aviation emissions in 2025 would range from 607 Mt CO_2 with a CO_2/non-CO_2 tax, to 722 Mt CO_2 in a business-as-usual scenario, with emissions expected to grow to 780 Mt CO_2 by 2050 under taxation. The introduction of a drop-in quota of 4% per year to fully replace Jet A by 2050 results in zero net CO_2 emissions. Nuclear power would raise airfares the most, limiting demand, while solar power, the cheapest energy source, would enable the highest growth in aviation demand, with airfares increasing by 80% by 2050. However, non-CO_2 warming effects from synthetic fuels could continue unless mitigated.	
The study's results, based on partial least squares path modeling (PLS-PM), revealed that subjective norm, perceived behavioral control, attitude toward green airlines, and environmental consciousness all significantly influenced green purchase intention. Specifically, subjective norm ($\beta = 0.366$), perceived behavioral control ($\beta = 0.197$), attitude toward green airlines ($\beta = 0.266$), and environmental consciousness ($\beta = 0.196$) were positively associated with green purchase intention. Additionally, green purchase intention ($\beta = 0.542$) was a strong predictor of willingness to pay more for green airlines. All hypotheses were supported, with the model showing good predictive relevance and fit.	
The analysis of airline marketing campaigns reveals three dominant tropes: adventure and discovery, privilege, and urgency. These strategies aim to position the consumer as an independent traveler exploring unique destinations, while also emphasizing exclusivity and social status through frequent flyer programs. Furthermore, a sense of urgency is often created to spur immediate bookings, using time-limited offers and scarcity tactics. These tropes, intertwined with individualized identity and fear of missing out, encourage consumers to act quickly and affirm their privilege within the consumer hierarchy.	
This study highlights the persistent attitude-behavior gap in discretionary air travel, demonstrating that while individuals express environmental concern, they are often unwilling to change their flying behavior, especially in tourism contexts. The research shows that tourism spaces are generally subject to lower environmental concern compared to day-to-day practices, with most participants not applying the same sustainability standards to their travel decisions. The study argues that meaningful behavioral change in this context is unlikely without government intervention, as efforts to nudge individuals toward more sustainable choices are insufficient. It emphasizes the need for stronger global policy interventions to address aviation's climate impacts.	
This study highlights two key insights regarding aviation's contribution to climate change: a large portion of aviation emissions is not covered by current climate policies, particularly domestic, military, and private aviation emissions, and a significant share of air transport demand is concentrated among affluent frequent fliers. These high emitters contribute disproportionately to aviation's environmental impact, while existing market-based measures, such as CORSIA and EU ETS, are unlikely to reduce emissions effectively. The study underscores the urgent need for more comprehensive aviation climate governance, with a focus on reducing emissions from the most frequent fliers and addressing the unaccounted emissions in the aviation sector.	
The study demonstrates that persuasive sustainability communication is most effective when messages emphasize self-benefits over normative appeals, particularly in individualistic cultures like the Netherlands. Messages combining self-benefits with social norms are more impactful when tailored to relatable reference groups. Practical applications include training and workshops for Dutch tour operators, leading to improved confidence and relevance in sustainability messaging. These insights informed the ANVR's "Better Holidays" program, emphasizing customer-focused sustainability communication, and inspired the development of a manual for improving such practices across the tourism industry.	
This study demonstrates that values significantly influence decisions to voluntarily reduce holiday air travel. While self-transcendence values, such as climate change concerns, do not inherently motivate behavior change, they can support reductions when paired with a sense of personal responsibility, moral obligation, and self-direction, allowing individuals to reject socially dominant norms around air travel. Reducers prioritize environmental care and intrinsic motivations over perceived outcome efficacy, distancing themselves from societal norms despite potential criticism. However, the findings highlight challenges for initiatives seeking to encourage such changes, emphasizing the need for long-term cultural shifts, value-focused engagement, and complementary policy measures like industry regulation and emission taxation.	

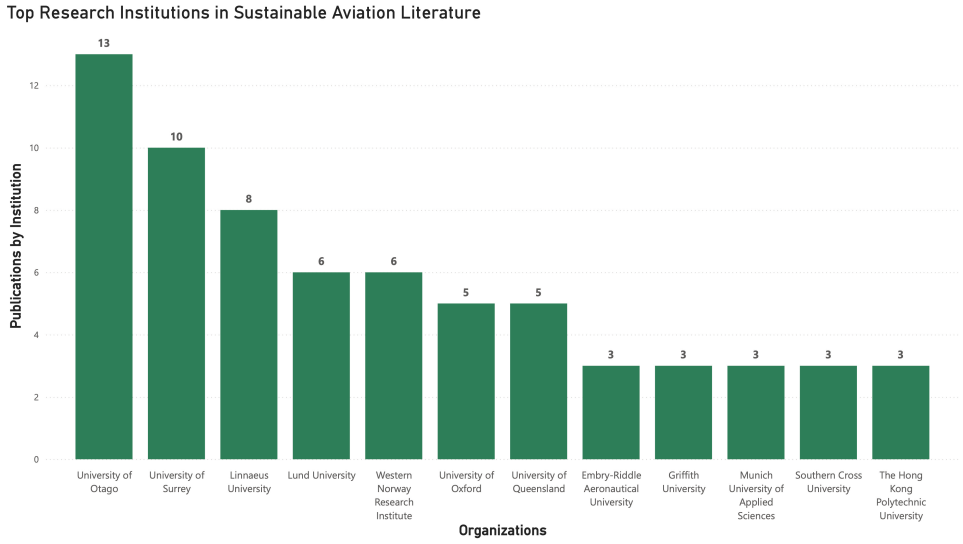
Appendix C: Supplemental Graphs 1

Supplemental Power BI Graphs Literature Review

Appendix Graphic 1: Top Authors by Number of Publications on Sustainable Aviation

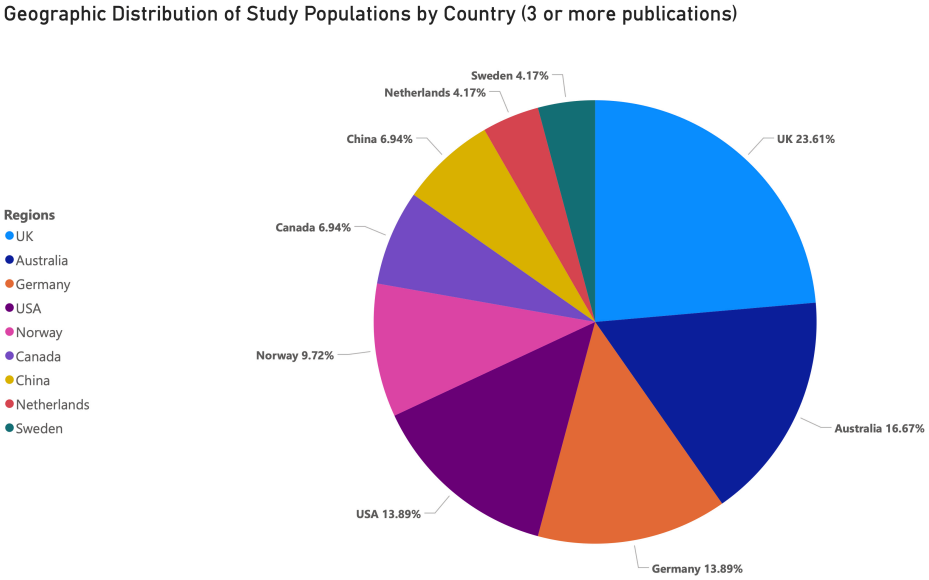


Appendix Graphic 2: Top Research Institutions in Sustainable Aviation Literature

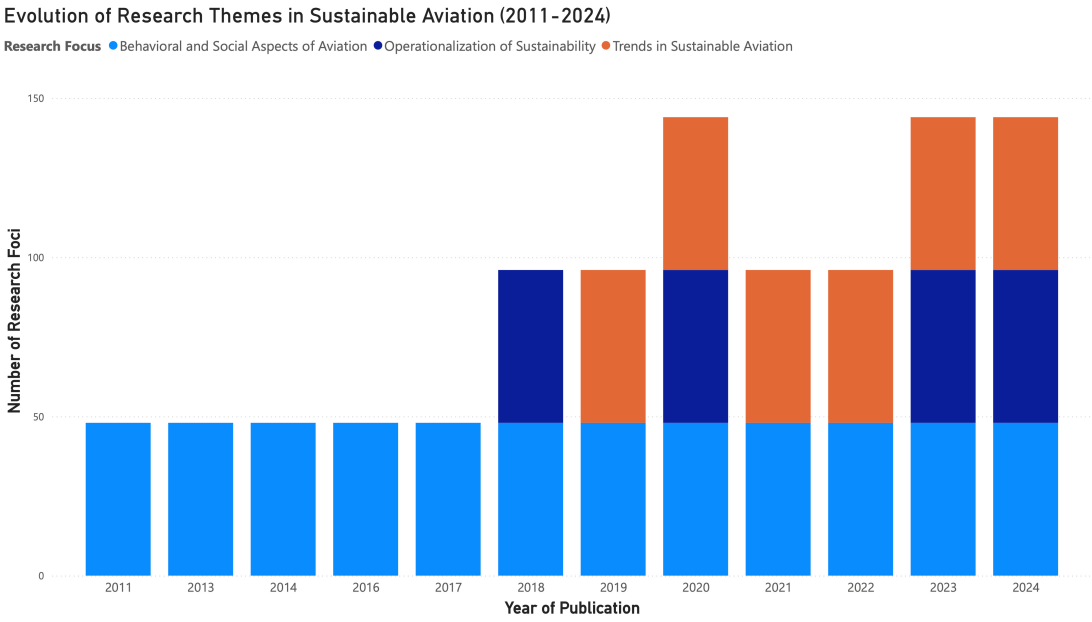


Appendix Graphic 3: Geographic Distribution of Study Populations by Country

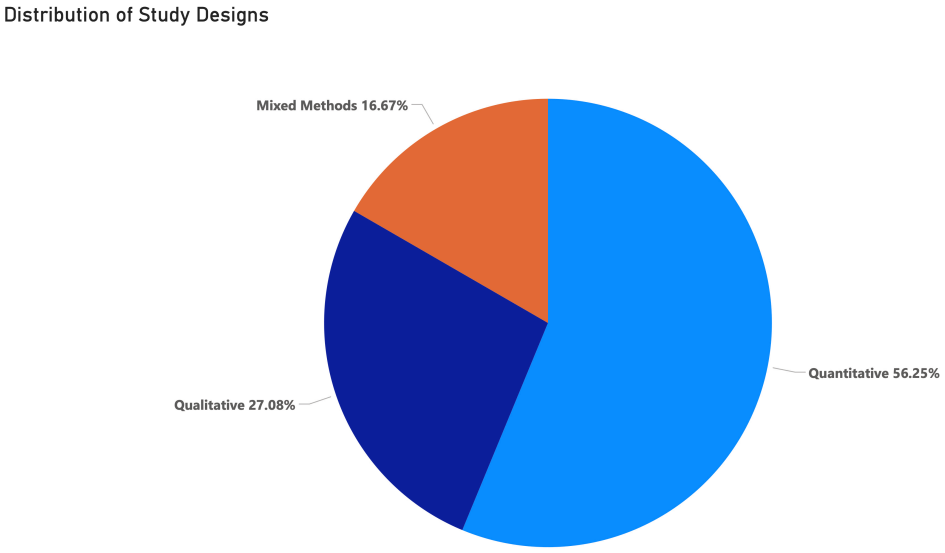
Appendix Graphic 4: Geographic Distribution of Study Populations by Country II



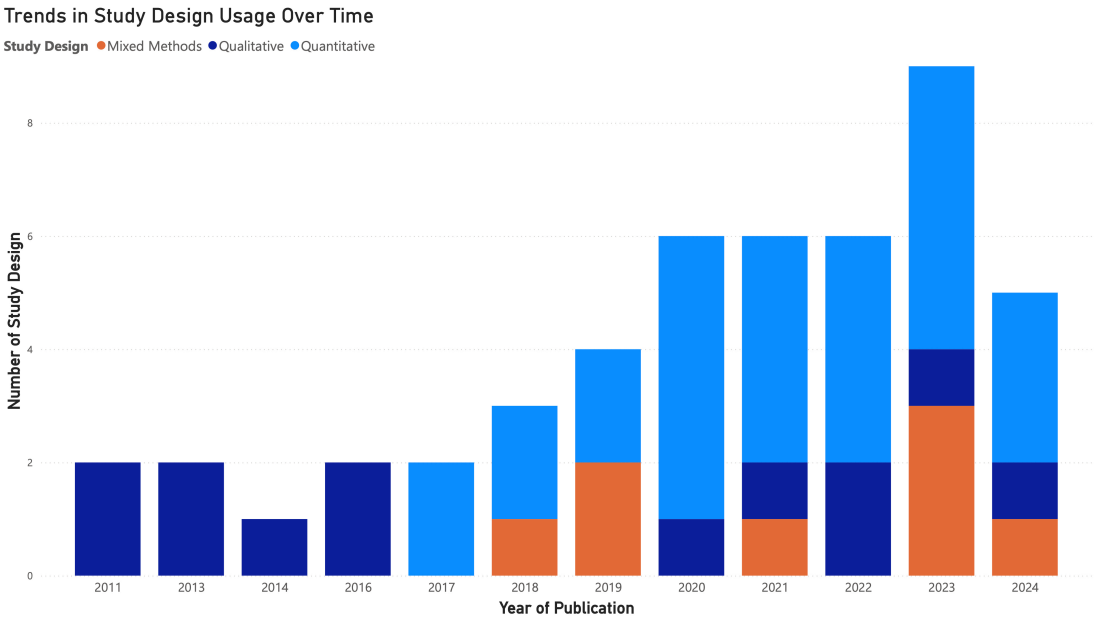
Appendix Graphic 5: Evolution of Research Themes in Sustainable Aviation



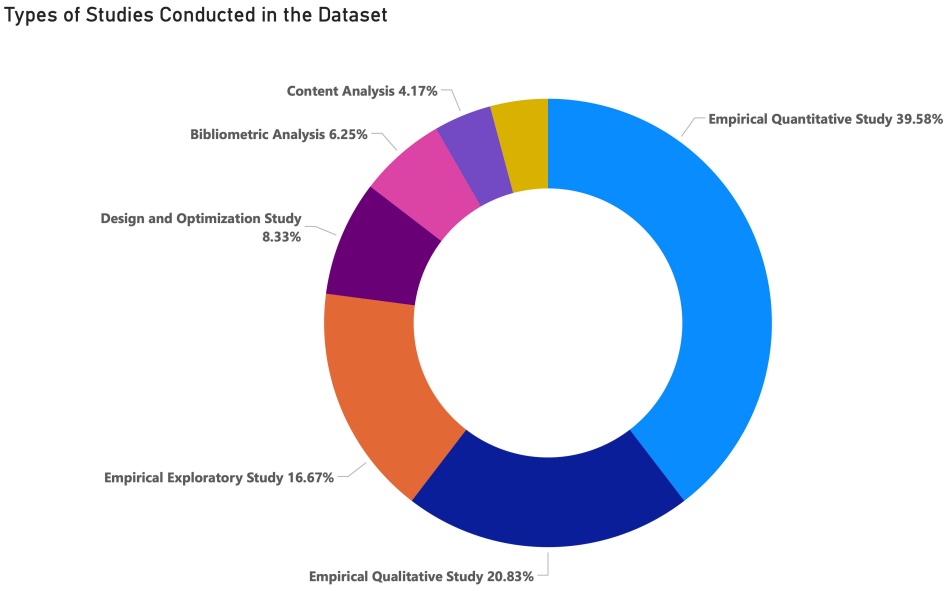
Appendix Graphic 6: Distribution of Study Designs



Appendix Graphic 7: Trends in Study Design Usage Over Time



Appendix Graphic 8: Types of Studies Conducted in the Dataset



Appendix Table 2: Most Used Keywords in Dataset

Keyword	Occurrence of Keyword in Dataset
Aviation	12
Climate change	11
Air travel	7
Sustainability	6
Green aviation	5
Willingness to pay	5
Behaviour change	4
Attitudes	3
Climate policy	3
COVID-19	3

Appendix D

Influence Analysis

ID	Name of Author	Number of Papers in the Dataset	Name of Papers	Total citations based on Dataset	Total	H-Index Details	H-Index	G-Index Details	G-Index	M-Index Details	M-Index	
1	**James Higham**	15	1. BINGE FLYING – Behavioural Addiction and Climate Change	168	960	1. 168 ≥ 1	10	**1. 168** + 144 > 1^2 = 1	15	10/(2024-2011)	0,76923077	
			2. Can we fly less? Evaluating the 'necessity' of air travel	131		2. 144 ≥ 2		**2. 312** + 131 > 2^2 = 4				
			3. Canary in the coalmine: Norwegian attitudes towards climate change and extreme long-haul air travel to Aotearoa/New Zealand	121		3. 131 ≥ 3		**3. 443** + 121 > 3^2 = 9				
			4. Climate change, tourist air travel and radical emissions reduction	144		4. 121 ≥ 4		**4. 564** + 91 > 4^2 = 16				
			5. Climate Change, Discretionary Air Travel, and the "Flyers' Dilemma"	91		5. 91 ≥ 5		**5. 655** + 68 > 5^2 = 25				
			6. Does carbon pricing reduce air travel? Evidence from the Australian 'Clean TEnergy	68		6. 68 ≥ 6		**6. 723** + 68 > 6^2 = 36				
			7. Envisioning future travel: Moving from high to low carbon systems	7		7. 68 ≥ 7		**7. 791** + 25 > 7^2 = 49				
			8. Healthy persuasion: a values-based messaging approach to leisure air travel decision-making	1		8. 25 ≥ 8		**8. 816** + 23 > 8^2 = 64				
			9. Managing tourism emissions through optimizing the tourism demand mix: Concept and analysis	68		9. 23 ≥ 9		**9. 839** + 22 > 9^2 = 81				
			10. The Rich Kids of Instagram: Luxury Travel, Transport Modes, and Desire	23		**10. 22 ≥ 10**		10. **861** + 7 > 10^2 = 100				
			11. Aeromasculinities and the fallacy of sustainable aviation	7		11. 7 ≥ 11		11. **868** + 7 > 11^2 = 121				
			12. Air travel and persuasive climate communications	2				12. **875** + 2 > 12^2 = 144				
			13. Consumer attitudes towards flying amidst growing climate concern	22				13. **877** + 1 > 13^2 = 169				
			14. Reconfiguring Aviation for a 14. Climate- Safe Future: Are Airlines Sending the Wrong Message?	25				14. **878** + 1 > 14^2 = 196				
			15. Sociological barriers to developing sustainable discretionary air travel behaviour	82				15. **879 > 15^2 = 225**				
2	**Scott Cohen**	9	1. BINGE FLYING – Behavioural Addiction and Climate Change	168	792	1. 168 ≥ 1	8	1. 168 > 1	9	8/(2023-2011)	0,66666667	
			2. Can we fly less? Evaluating the 'necessity' of air travel	131		2. 144 ≥ 2		2. 312 > 4				
			3. Canary in the coalmine: Norwegian attitudes towards climate change and extreme long-haul air travel to Aotearoa/New Zealand	121		3. 131 ≥ 3		3. 443 > 9				
			4. Climate change, tourist air travel and radical emissions reduction	144		4. 121 ≥ 4		4. 564 > 16				
			5. Climate Change, Discretionary Air Travel, and the "Flyers' Dilemma"	91		5. 91 ≥ 5		5. 655 >25				
			6. The Rich Kids of Instagram: Luxury Travel, Transport Modes, and Desire	23		6. 82 ≥ 6		6. 737 > 36				
			7. Aeromasculinities and the fallacy of sustainable aviation	7		7. 25 ≥ 7		7. 762 > 49				
			8. Reconfiguring Aviation for a 14. Climate- Safe Future: Are Airlines Sending the Wrong	25		**8. 23 ≥ 8**		8. 785 > 64				
			9. Sociological barriers to developing sustainable discretionary air travel behaviour	82		9. 7 ≥ 9		**9. 792 > 81**				
3	**Stefan Gössling**	8	1. Can we fly less? Evaluating the 'necessity' of air travel	131	718	1. 267 ≥ 1	7	1. 267 > 1	8	7/(2023-2013)	0,7	
			2. The Rich Kids of Instagram: Luxury Travel, Transport Modes, and Desire	23		2. 131 ≥ 2		2. 398 > 4				
			3. Aeromasculinities and the fallacy of sustainable aviation	7		3. 130 ≥ 3		3. 528 > 9				
			4. Does 'flight shame' affect social norms? Changing perspectives on the desirability of air travel in Germany	130		4. 112 ≥ 4		4. 640 > 16				
			5. Identity and tourism mobility: an exploration of the attitude–behaviour gap	112		5. 25 ≥ 5		5. 665 > 25				
			6. Net-zero aviation: Time for a new business model?	23		6. 23 ≥ 6		6. 688 > 36				
			7. Reconfiguring Aviation for a Climate- Safe Future: Are Airlines Sending the Wrong	25		**7. 23 ≥ 7**		7. 711 > 49				
			8. The global scale, distribution and growth of aviation: Implications for climate change	267		8. 7 ≥ 8		**8. 718 > 64**				
4	**Debbie Hopkins**	5	1. Can we fly less? Evaluating the 'necessity' of air travel	131	187	1. 131 ≥ 1	4	1. 131 > 1	5	4/(2024-2019)	0,8	
			2. Healthy persuasion: a values-based messaging approach to leisure air travel decision-making	1		2. 25 ≥ 2		2. 156 > 4				
			3. The Rich Kids of Instagram: Luxury Travel, Transport Modes, and Desire	23		3. 23 ≥ 3		3. 179 > 9				
			4. Aeromasculinities and the fallacy of sustainable aviation	7		**4. 7 ≥ 4**		4. 186 > 16				
			5. Reconfiguring Aviation for a Climate- Safe Future: Are Airlines Sending the Wrong	25		5. 1 ≥ 5		**5. 187 > 25**				
5	**Paul Hanna**	4	1. Can we fly less? Evaluating the 'necessity' of air travel	131	186	1. 131 ≥ 1	4	1. 131 > 1	4	4/(2023-2019)	1	1,67
			2. The Rich Kids of Instagram: Luxury Travel, Transport Modes, and Desire	23		2. 25 ≥ 2		2. 156 > 4				
			3. Aeromasculinities and the fallacy of sustainable aviation	7		3. 23 ≥ 3		3. 179 > 9				
			4. Reconfiguring Aviation for a Climate- Safe Future: Are Airlines Sending the Wrong	25		**4. 7 ≥ 4**		**4. 186 > 16**				
6	**Andreas Humpe**	3	1. Does 'flight shame' affect social norms? Changing perspectives on the desirability of air travel in Germany	130	420	1. 267 ≥ 1	3	1. 267 > 1	3	3/(2023-2020)	1	0,944
			2. Net-zero aviation: Time for a new business model?	23		2. 130 ≥ 2		2. 397 > 4				
			3. The global scale, distribution and growth of aviation: Implications for climate change	267		**3. 23 ≥ 3**		**3. 420 > 9**				
7	**Arianne Reis**	3	1. Climate change, tourist air travel and radical emissions reduction	144	294	1. 144 ≥ 1	3	1. 144 > 1	3	3/(2018-2013)	0,6	
			2. Does carbon pricing reduce air travel? Evidence from the Australian 'Clean TEnergy	68		2. 82 ≥ 2		2. 226 > 4				
			3. Sociological barriers to developing sustainable discretionary air travel behaviour	82		**3. 68 ≥ 3**		**3. 294 > 9**				
8	**Christina T. Cavaliere**	3	1. BINGE FLYING – Behavioural Addiction and Climate Change	168	403	1. 168 ≥ 1	3	1. 168 > 1	3	3/(2016-2011)	0,6	
			2. Climate change, tourist air travel and radical emissions reduction	144		2. 144 ≥ 2		2. 312 > 4				
			3. Climate Change, Discretionary Air Travel, and the "Flyers' Dilemma"	91		**3. 91 ≥ 3**		**3. 403 > 9**				
9	**Nicole Cocolas**	3	1. Air travel and persuasive climate communications	2	49	1. 25 ≥ 1	2	1. 25 > 1	3	2/(2023-2020)	0,66666667	
			2. Consumer attitudes towards flying amidst growing climate concern	22		**2. 22 ≥ 2**		2. 47 > 4				
			3. Reconfiguring Aviation for a Climate- Safe Future: Are Airlines Sending the Wrong	25		3. 2 ≥ 3		**3. 49 > 9**				
10	**Stephen Rice**	3	1. Emotions and caring mediate the relationship between knowledge of sustainability and willingness to pay for greener aviation	13	82	1. 38 ≥ 1	3	1. 38 > 1	3	3/(2021-2020)	3	1,53846154
			2. The development of 'green' airports: Which factors influence willingness to pay for sustainability and intention to act? A structural and mediation model analysis	31		2. 31 ≥ 2		2. 69 > 4				
			3. Willingness to pay for sustainable aviation depends on ticket price, greenhouse gas reductions and gender	38		**3. 13 ≥ 3**		**3. 82 > 9**				

ID	Name of Journal	Number of Papers in the Dataset	Name of Papers	Total citations based on Dataset	Total	H-Index Details	H-Index	G-Index Details	G-Index	M-Index Details	M-Index	
	Journal of Sustainable Tourism	10	1. Healthy persuasion: a values-based messaging approach to leisure air travel decision-making	1	328	1. 112 ≥ 1	7	1. 112 + 82 > 1^2 = 1	10	7/(2024-2013)	0,63636364	
			2. Nudging the jet set to offset: voluntary carbon offsetting and the limits to nudging	22		2. 82 ≥ 2		2. 194 + 39 > 2^2 = 4				
			3. Pathway to zero emissions in global tourism: opportunities, challenges, and implications	6		3. 39 ≥ 3		3. 233 + 22 > 3^2 = 9				
			4. The anchoring effect of aviation green tax for sustainable tourism, based on the nudge theory	22		4. 22 ≥ 4		4. 255 + 22 > 4^2 =16				
			5. Air travel and persuasive climate communications	2		5. 22 ≥ 5		5. 277 + 22 > 5^2 = 25				
			6. Consumer attitudes towards flying amidst growing climate concern	22		6. 22 ≥ 6		6. 299 + 20 > 6^2 = 36				
			7. Flying in the Face of Climate Change: Quantitative psychological approach examining the social drivers of individual air travel	20		**7. 20 ≥ 7**		7. 319 + 6 > 7^2 = 49				
			8. Identity and tourism mobility: an exploration of the attitude–behaviour gap	112		8. 6 ≥ 8		8. 325 + 2 > 8^2 = 64				
			9. Sociological barriers to developing sustainable discretionary air travel behaviour	82				9. 327 + 1 > 9^2 = 81				
			10. The role of values for voluntary reductions of holiday air travel	39				**10. 328 > 10^2 = 100**				
2	**Tourism Management**	5	1. Canary in the coalmine: Norwegian attitudes towards climate change and extreme long-haul air travel to Aotearoa/New Zealand	121	295	1. 121 ≥ 1	4	1. 121 + 85 > 1^2 = 1	5	5/(2023-2011)	0,41666667	
			2. Managing tourism emissions through optimizing the tourism demand mix: Concept and analysis	68		2. 85 ≥ 2		2. 206 + 68 > 2^2 = 4				
			3. The choice between business travel and video conferencing after COVID-19 – Insights from a choice experiment among frequent travelers	21		3. 68 ≥ 3		3. 274 + 21 > 3^2 = 9				
			4. The sustainability characteristics of international air routes: A composite index approach	0		**4. 21 ≥ 4**		4. 295 + 0 > 4^2 =16				
			5. The power of persuasive communication to influence sustainable holiday choices: Appealing to self-benefits and norms	85		5. 0 ≥ 5		**5. 295 > 5^2 = 25**				
3	**Journal of Air Transport Management**	4	1. Life cycle assessment in aviation: A systematic literature review of applications, methodological approaches and challenges	21	295	1. 131 ≥ 1	4	1. 131 + 120 > 1^2 = 1	4	4/(2023-2019)	1	3,12903226
			2. Can we fly less? Evaluating the 'necessity' of air travel	131		2. 120 ≥ 2		2. 251 + 23 > 2^2 = 4				
			3. An electric airplane: Assessing the effect of travelers' perceived risk, attitude, T and new product knowledge	120		3. 23 ≥ 3		3. 274 + 21 > 3^2 = 9				
			4. Net-zero aviation: Time for a new business model?	23		**4. 21 ≥ 4**		**4. 295 > 4^2 =16**				
4	**Journal of Cleaner Production**	4	1. Climate change, tourist air travel and radical emissions reduction	144	315	1. 144 ≥ 1	4	1. 144 + 130 > 1^2 = 1	4	4/(2022-2016)	0,66666667	
			2. Green hub-and-spoke network design for aviation industry	28		2. 130 ≥ 2		2. 274 + 28 > 2^2 = 4				
			3. Does 'flight shame' affect social norms? Changing perspectives on the desirability of air travel in Germany	130		3. 28 ≥ 3		3. 302 + 13 > 3^2 = 9				
			4. Sustainable commercial aviation: What determines air travellers' willingness to pay more for sustainable aviation fuel?	13		**4. 13 ≥ 4**		**4. 315 > 4^2 =16**				
5	**Journal of Travel Research**	4	1. Climate Change, Discretionary Air Travel, and the "Flyers' Dilemma"	91	161	1. 91 ≥ 1	4	1. 91 + 34 > 1^2 = 1	4	4/(2022-2014)	0,5	
			2. The Rich Kids of Instagram: Luxury Travel, Transport Modes, and Desire	23		2. 34 ≥ 2		2. 125 + 23 > 2^2 = 4				
			3. Air Passengers' Preferences for Aviation Voluntary Carbon Offsetting: A Co-benefits Perspective	13		3. 23 ≥ 3		3. 148 + 13 > 3^2 = 9				
			4. Reconfiguring Aviation for a Climate- Safe Future: Are Airlines Sending the Wrong Message?	34		**4. 13 ≥ 4**		**4. 161 > 4^2 =16**				
6	**Technology in Society**	3	1. Emotions and caring mediate the relationship between knowledge of sustainability and willingness to pay for greener aviation	13	82	1. 38 ≥ 1	3	1. 38 + 31 > 1^2 = 1	3	3/(2021-2020)	3	1,91304348
			2. The development of 'green' airports: Which factors influence willingness to pay for sustainability and intention to act? A structural and mediation model analysis	31		2. 31 ≥ 2		2. 69 + 13 > 2^2 = 4				
			3. Willingness to pay for sustainable aviation depends on ticket price, greenhouse gas reductions and gender	38		**3. 13 ≥ 3**		**3. 82 > 3^2 = 9**				
7	**Annals of Tourism Research**	2	1. BINGE FLYING – Behavioural Addiction and Climate Change	168	226	1. 168 ≥ 1	2	1. 168 + 58 > 1^2 = 1	2	2/(2018-2011)	0,28571429	4,15384615
			2. Estimating willingness to pay air passenger duty	58		**2. 58 ≥ 2**		**2. 226 > 2^2 = 4**				
8	**Global Environmental Change**	2	1. 'Green' on the ground but not in the air: Pro-environmental attitudes are related to household behaviours but not discretionary air travel	120	387	1. 267 ≥ 1	2	1. 267 + 120 > 1^2 = 1	2	2/(2020-2017)	0,66666667	
			2. The global scale, distribution and growth of aviation: Implications for climate change	267		**2. 120 ≥ 2**		**2. 387 > 2^2 = 4**				
9	**Transportation Research Interdisciplinary Perspectives**	2	1. Baggage dissociation for sustainable air travel: Design study of ground baggage distribution networks	2	26	1. 24 ≥ 1	2	1. 24 + 2 > 1^2 = 1	2	2/(2023-2021)	1	7,5
			2. Impact of political and market-based measures on aviation emissions and passenger behaviors (a Swiss case study)	24		**2. 2 ≥ 2**		**2. 26 > 2^2 = 4**				

ID	Name of Article	Authors	Year of Publication	Citation Count (Global)
1	The global scale, distribution and growth of aviation: Implications for climate change	Gössling & Humpe	2020	267
2	BINGE FLYING – Behavioural Addiction and Climate Change	Cohen et al.	2011	168
3	Climate change, tourist air travel and radical emissions reduction	Higham et al.	2016	144
4	Can we fly less? Evaluating the 'necessity' of air travel	Gössling et al.	2019	131
5	Does 'flight shame' affect social norms? Changing perspectives on the desirability of air travel in Germany	Gössling et al.	2020	130
6	Canary in the coalmine: Norwegian attitudes towards climate change and extreme long-haul air travel to Aotearoa/New Zealand	Higham & Cohen	2011	121
7	'Green' on the ground but not in the air: Pro-environmental attitudes are related to household behaviours but not discretionary air travel	Alcocka et al.	2017	120
8	An electric airplane: Assessing the effect of travelers' perceived risk, attitude, T and new product knowledge	Han et al.	2019	120
9	Identity and tourism mobility: an exploration of the attitude–behaviour gap	Hibbert et al.	2013	112
10	Climate Change, Discretionary Air Travel, and the "Flyers' Dilemma"	Higham et al.	2014	91
11	The power of persuasive communication to influence sustainable holiday choices: Appealing to self-benefits and norms	Hardeman et al.	2017	85
12	Sociological barriers to developing sustainable discretionary air travel behaviour	Cohen et al.	2013	82
13	Does carbon pricing reduce air travel? Evidence from the Australian 'Clean T Energy Future' policy, July 2012 to June 2014	Markham et al.	2018	68
14	Managing tourism emissions through optimizing the tourism demand mix: Concept and analysis	Sun et al.	2020	68
15	Estimating willingness to pay air passenger duty	Seetaram et al.	2018	58
16	Green aviation industry sustainable development towards an integrated support system	Qiu et al.	2021	46
17	Global tourism, climate change and energy sustainability: assessing carbon reduction mitigating measures from the aviation industry	Filho et al.	2023	45
18	Strategies to Mitigate Carbon Emissions for Sustainable Aviation: A Critical Review From a Life-cycle Perspective	Hu et al.	2022	44
19	The role of values for voluntary reductions of holiday air travel	Büchs	2026	39
20	Willingness to pay for sustainable aviation depends on ticket price, greenhouse gas reductions and gender	Rice et al.	2020	38
21	The development of 'green' airports: Which factors influence willingness to pay for sustainability and intention to act? A structural and mediation model analysis	Winter et al.	2021	31
22	Green hub-and-spoke network design for aviation industry	Parsa et al.	2019	28
23	Reconfiguring Aviation for a Climate- Safe Future: Are Airlines Sending the Wrong Message?	Higham et al.	2022	25
24	Impact of political and market-based measures on aviation emissions and passenger behaviors (a Swiss case study)	Wild et al.	2021	24
25	The Rich Kids of Instagram: Luxury Travel, Transport Modes, and Desire	Cohen et al.	2022	23
26	Net-zero aviation: Time for a new business model?	Gössling & Humpe	2023	23
27	Nudging the jetset to offset: voluntary carbon offsetting and the limits to nudging	Tyers	2018	22
28	The anchoring effect of aviation green tax for sustainable tourism, based on the nudge theory	Kim et al.	2021	22
29	Consumer attitudes towards flying amidst growing climate concern	Cocolas et al.	2020	22
30	Life cycle assessment in aviation: A systematic literature review of applications, methodological approaches and challenges	Keiser et al.	2023	21
31	The choice between business travel and video conferencing after COVID-19 – Insights from a choice experiment among frequent travelers	Müller & Wittmer	2023	21
32	Flying in the Face of Climate Change: Quantitative psychological approach examining the social drivers of individual air travel	Oswald & Ernst	2020	20
33	Climate Action at International Airports: An Analysis of the Airport Carbon Accreditation Programme	Dube	2021	15
34	Air Passengers' Preferences for Aviation Voluntary Carbon Offsetting: A Co-benefits Perspective	Zhang et al.	2022	13
35	Emotions and caring mediate the relationship between knowledge of sustainability and willingness to pay for greener aviation	Ragbir et al.	2021	13
36	Sustainable commercial aviation: What determines air travellers' willingness to pay more for sustainable aviation fuel?	Xua et al.	2022	13
37	Purchase Intention Toward Green Airlines and Willingness to Pay More: Extending the Theory of Planned Behavior	Akan et al.	2022	8
38	Envisioning future travel: Moving from high to low carbon systems	Fletcher at al.	2019	7
39	Aeromasculinities and the fallacy of sustainable aviation	Hopkins et al.	2023	7
40	"Door-to-door" carbon emission calculation for airlines – Its decarbonization potential and impact	Li & Merkert	2023	6
41	Pathway to zero emissions in global tourism: opportunities, challenges, and implications	Peeters & Papp	2024	6
42	How airports enhance the environmental sustainability of operations: A critical review from the perspective of Operations Research	Chen et al.	2024	5
43	Baggage dissociation for sustainable air travel: Design study of ground baggage distribution networks	Al-Hilfi et al.	2023	2
44	Air travel and persuasive climate communications	Cocolas et al.	2023	2
45	Trends and emerging research directions of sustainable aviation: A bibliometric analysis	Dinçer et al.	2024	1
46	Healthy persuasion: a values-based messaging approach to leisure air travel decision-making	Higham et al.	2024	1
47	The sustainability characteristics of international air routes: A composite index approach	Koo et al.	2023	0
48	Economic impacts of power-to-liquid fuels in aviation: A general equilibrium analysis of production and utilization in Germany	Mueller et al.	2024	0

Motivations and Constraints for Supporting Sustainable Air Travel

Dear Participant,

Thank you for taking the time to participate in this survey. This questionnaire is part of my Master's dissertation in Tourism Organisations Management at the Faculty of Economics of the University of the Algarve. The study aims to understand the motivations and constraints influencing air passengers' support for sustainable air travel. Your responses will provide valuable insights into the factors that encourage or discourage individuals from investing in environmentally friendly aviation options.

Purpose of the Study

The primary objective of this research is to investigate the drivers and barriers that prevent plane travelers from paying more for sustainable air travel. Additionally, the study seeks to explore the relationship between the frequency of air travel, sustainability awareness, and the willingness to support eco-friendly aviation. Your input is crucial in helping me understand these dynamics and contribute to the broader field of sustainable tourism.

Anonymity and Confidentiality

Participation in this survey is completely voluntary and anonymous. All the data collected will be used solely for academic purposes and kept strictly confidential. No personal identifiers will be linked to the data, ensuring that your identity remains anonymous. The results will be reported in aggregate form, and no individual responses will be identifiable.

Instructions

The questionnaire will take approximately 5-10 minutes to complete. Please answer all questions as honestly and accurately as possible. Your cooperation and candid responses are greatly appreciated.

If you have any questions or require further information, please feel free to contact me at a82573@ualg.pt.

By proceeding with this survey, you acknowledge that you have read and understood the purpose of the study and consent to participate under the conditions stated above.

Thank you once again for your valuable contribution.

Sincerely,

Laura Siegl

Master's Student in Tourism Organisations Management

University of Algarve

a82573@ualg.pt

PS: Users of the research platform SurveyCircle.com will receive SurveyCircle points for their participation. Furthermore, this survey contains Karma to get free survey responses at SurveySwap.io.

* Indicates required question

1. What factors motivate you to support sustainable air travel? *

Multiple options

Check all that apply.

- [ ] Reducing carbon footprint
- [ ] Preserving the environment for future generations
- [ ] Improved air quality
- [ ] Reduced noise pollution
- [ ] Supporting airlines that prioritize sustainability
- [ ] Investing in new, eco-friendly technologies
- [ ] Commitment to sustainability and ethical travel choices
- [ ] Other: _____

2. What factors hinder you from supporting sustainable air travel? *

Multiple options

Check all that apply.

- [ ] Higher costs
- [ ] Limited availability of sustainable flights
- [ ] Difficulty in finding and booking sustainable flights
- [ ] Lack of awareness regarding sustainable options
- [ ] Insufficient information on eco-friendly options
- [ ] Skepticism about the impact of sustainable practices
- [ ] Loyalty to non-sustainable airlines
- [ ] Prioritizing other travel factors over sustainability
- [ ] Other: _____

3. How often do you travel by air? *

Based on round-trips; one option

Mark only one oval.

- ◯ Never
- ◯ Once a year
- ◯ 2-3 times a year
- ◯ 4-6 times a year
- ◯ 7-10 times a year
- ◯ More than 10 times a year

4. Do you think that frequent flyers should be more responsible in supporting sustainable aviation options? *

Mark only one oval.

- ◯ Yes
- ◯ No

5. How aware are you of sustainability and sustainable air travel options? *

Mark only one oval.

	1	2	3	4	
Not	◯	◯	◯	◯	Very aware

6. What sustainable air travel options have you heard of? *

Multiple options

Check all that apply.

- [ ] Carbon offset programs
- [ ] Sustainable Aviation Fuels (SAF)
- [ ] Electric and hybrid aircraft
- [ ] Fuel-efficient aircraft
- [ ] Reduced emission flight routes
- [ ] Green airports
- [ ] Eco-friendly in-flight services
- [ ] Noise reduction technologies
- [ ] Sustainable airline partnerships
- [ ] Other: _____

7. Do you believe that increased awareness of sustainable air travel options would make you more likely to support them? *

Mark only one oval.

- ◯ Yes
- ◯ No

8. How willing are you to pay more for an environmentally friendly flight? *

Mark only one oval.

	1	2	3	4	
Not	◯	◯	◯	◯	Very willing

9. For which type of flight would you be more inclined to pay extra for sustainable options? *

Mark only one oval.

- ◯ Short-haul
- ◯ Long-haul

10. Which sustainable aviation options would you be willing to pay more for? *

Multiple options

Check all that apply.

- ☐ Carbon offset programs: passengers can pay to offset the carbon emissions of their flights by funding environmental projects, such as reforestation or renewable energy initiatives.
- ☐ Sustainable Aviation Fuels (SAF): airlines use biofuels or other alternative fuels that produce fewer carbon emissions compared to conventional jet fuel.
- ☐ Electric and hybrid aircraft: emerging technologies that involve electric or hybrid-powered planes to reduce or eliminate fossil fuel consumption.
- ☐ Fuel-efficient aircraft: airlines investing in newer, more fuel-efficient aircraft that consume less fuel and produce fewer emissions per passenger.
- ☐ Reduced emission flight routes: airlines optimize flight paths to reduce fuel consumption and emissions, often through better air traffic management.
- ☐ Green airports: airports adopting sustainable practices, such as using renewable energy, reducing waste, and improving ground operations to minimize environmental impact.
- ☐ Eco-friendly in-flight services: airlines reducing single-use plastics, offering locally sourced food, and minimizing waste during flights.
- ☐ Noise reduction technologies: adoption of technologies and flight procedures that minimize noise pollution, which can be a component of broader environmental sustainability efforts.
- ☐ Sustainable airline partnerships: collaborations between airlines and environmental organizations to promote and implement sustainable practices in aviation.
- ☐ Other: _____

Demographic Questions

11. Which gender do you identify with? *

Mark only one oval.

- ◯ Female
- ◯ Male
- ◯ Other

12. Which age group do you belong to? *

Mark only one oval.

- ◯ Younger than 18
- ◯ 18-23
- ◯ 24-29
- ◯ 30-39
- ◯ 40-49
- ◯ 50-59
- ◯ 60-69
- ◯ Older than 70

13. What is your nationality? * Dropdown

Mark only one oval.

- Afghanistan
- Albania
- Algeria
- Andorra
- Angola
- Antigua & Deps
- Argentina
- Armenia
- Australia
- Austria
- Azerbaijan
- Bahamas
- Bahrain
- Bangladesh
- Barbados
- Belarus
- Belgium
- Belize
- Benin
- Bhutan
- Bolivia
- Bosnia Herzegovina
- Botswana
- Brazil
- Brunei
- Bulgaria
- Burkina
- Burundi
- Cambodia
- Cameroon

- [ ] Canada
- [ ] Cape Verde
- [ ] Central African Rep
- [ ] Chad
- [ ] Chile
- [ ] China
- [ ] Colombia
- [ ] Comoros
- [ ] Congo
- [ ] Congo {Democratic Rep}
- [ ] Costa Rica
- [ ] Croatia
- [ ] Cuba
- [ ] Cyprus
- [ ] Czech Republic
- [ ] Denmark
- [ ] Djibouti
- [ ] Dominica
- [ ] Dominican Republic
- [ ] East Timor
- [ ] Ecuador
- [ ] Egypt
- [ ] El Salvador
- [ ] Equatorial Guinea
- [ ] Eritrea
- [ ] Estonia
- [ ] Ethiopia
- [ ] Fiji
- [ ] Finland
- [ ] France
- [ ] Gabon
- [ ] Gambia
- [ ] Georgia

- [ ] Germany
- [ ] Ghana
- [ ] Greece
- [ ] Grenada
- [ ] Guatemala
- [ ] Guinea
- [ ] Guinea-Bissau
- [ ] Guyana
- [ ] Haiti
- [ ] Honduras
- [ ] Hungary
- [ ] Iceland
- [ ] India
- [ ] Indonesia
- [ ] Iran
- [ ] Iraq
- [ ] Ireland {Republic}
- [ ] Israel
- [ ] Italy
- [ ] Ivory Coast
- [ ] Jamaica
- [ ] Japan
- [ ] Jordan
- [ ] Kazakhstan
- [ ] Kenya
- [ ] Kiribati
- [ ] Korea North
- [ ] Korea South
- [ ] Kosovo
- [ ] Kuwait
- [ ] Kyrgyzstan
- [ ] Laos
- [ ] Latvia

- [ ] Lebanon
- [ ] Lesotho
- [ ] Liberia
- [ ] Libya
- [ ] Liechtenstein
- [ ] Lithuania
- [ ] Luxembourg
- [ ] Macedonia
- [ ] Madagascar
- [ ] Malawi
- [ ] Malaysia
- [ ] Maldives
- [ ] Mali
- [ ] Malta
- [ ] Marshall Islands
- [ ] Mauritania
- [ ] Mauritius
- [ ] Mexico
- [ ] Micronesia
- [ ] Moldova
- [ ] Monaco
- [ ] Mongolia
- [ ] Montenegro
- [ ] Morocco
- [ ] Mozambique
- [ ] Myanmar {Burma}
- [ ] Namibia
- [ ] Nauru
- [ ] Nepal
- [ ] Netherlands
- [ ] New Zealand
- [ ] Nicaragua
- [ ] Niger

- [ ] Nigeria
- [ ] Norway
- [ ] Oman
- [ ] Pakistan
- [ ] Palau
- [ ] Panama
- [ ] Papua New Guinea
- [ ] Paraguay
- [ ] Peru
- [ ] Philippines
- [ ] Poland
- [ ] Portugal
- [ ] Qatar
- [ ] Romania
- [ ] Russian Federation
- [ ] Rwanda
- [ ] St Kitts & Nevis
- [ ] St Lucia
- [ ] Saint Vincent & the Grenadines
- [ ] Samoa
- [ ] San Marino
- [ ] Sao Tome & Principe
- [ ] Saudi Arabia
- [ ] Senegal
- [ ] Serbia
- [ ] Seychelles
- [ ] Sierra Leone
- [ ] Singapore
- [ ] Slovakia
- [ ] Slovenia
- [ ] Solomon Islands
- [ ] Somalia
- [ ] South Africa

- [ ] South Sudan
- [ ] Spain
- [ ] Sri Lanka
- [ ] Sudan
- [ ] Suriname
- [ ] Swaziland
- [ ] Sweden
- [ ] Switzerland
- [ ] Syria
- [ ] Taiwan
- [ ] Tajikistan
- [ ] Tanzania
- [ ] Thailand
- [ ] Togo
- [ ] Tonga
- [ ] Trinidad & Tobago
- [ ] Tunisia
- [ ] Turkey
- [ ] Turkmenistan
- [ ] Tuvalu
- [ ] Uganda
- [ ] Ukraine
- [ ] United Arab Emirates
- [ ] United Kingdom
- [ ] United States
- [ ] Uruguay
- [ ] Uzbekistan
- [ ] Vanuatu
- [ ] Vatican City
- [ ] Venezuela
- [ ] Vietnam
- [ ] Yemen
- [ ] Zambia

- [ ] Zimbabwe
- [ ] Other

14. What is your highest level of education? *

Mark only one oval.

- [ ] Vocational Training/Apprenticeship
- [ ] High School degree
- [ ] Bachelor’s degree
- [ ] Master's degree
- [ ] PhD/Doctorate
- [ ] Other

15. What is your occupational status? *

Mark only one oval.

- [ ] Student
- [ ] Employed
- [ ] Self-Employed
- [ ] Unemployed
- [ ] Retired
- [ ] Other

16. What is your gross monthly income? *

Mark only one oval.

- ◯ Below 500 €
- ◯ 500-999 €
- ◯ 1.000-1.999 €
- ◯ 2.000-2.999 €
- ◯ 3.000-3.999 €
- ◯ 4.000-4.999 €
- ◯ 5.000-5.999 €
- ◯ 6.000-6.999 €
- ◯ 7.000-7.999 €
- ◯ 8.000-8.999 €
- ◯ 9.000-9.999 €
- ◯ Above 10.000 €

N°	Question	Objectives of the question	References used to prepare the question	Summary of references	Research gaps discovered in those references
1	**What factors motivate you to support sustainable air travel? (multiple choice question with a text field at the end for more options)**	To identify the key motivations and drivers that encourage passengers to choose sustainable air travel options. This helps in understanding which aspects of sustainability are most valued by travelers.	1) Lisa Oswald & Andreas Ernst (2021). Flying in the Face of Climate Change: Quantitative psychological approach examining the social drivers of individual air travel, Journal of Sustainable Tourism, 29:1, 68-86, https://doi.org/10.1080/09669582.2020.1812616 2) Connor Rice, Nadine K. Ragbir, Stephen Rice, Gina Barcia (2020). Willingness to pay for sustainable aviation depends on ticket price, greenhouse gas reductions and gender, Technology in Society, 60, https://doi.org/10.1016/j.techsoc.2019.101224 3) Alexander Gerich (2021). Is Sustainable Aviation Ready for Take-Off? An Analysis of Airline Initiatives and Passenger Views on Sustainable Business Practices in the Aviation Industry. Nova School of Business and Economics. https://run.unl.pt/bitstream/10362/142626/1/2021-22_fall_44130_alexander-gerich.pdf 4) Nicole Cocolas, Gabrielle Walters, Lisa Ruhanen & James Higham (2021). Consumer attitudes towards flying amidst growing climate concern, Journal of Sustainable Tourism, 29:6, 944-963, https://doi.org/10.1080/09669582.2020.1849234 5) Nadine K. Ragbir, Stephen Rice, Scott R. Winter, Elaine C. Choy (2021). Emotions and caring mediate the relationship between knowledge of sustainability and willingness to pay for greener aviation, Technology in Society, 64, https://doi.org/10.1016/j.techsoc.2020.101491 6) BingXua, Salman Ahmad, Vincent Charles, Jin Xuan (2022). Sustainable commercial aviation: What determines air travelers' willingness to pay more for sustainable aviation	1) This paper explores how individual behavior, technological improvements, and policies can reduce emissions in aviation, a significant contributor to climate change. Through online surveys, it examines social influences on air travel using new instruments. Findings show that environmental awareness prompts engagement with carbon offsets, while global social connections lead to increased travel. Additionally, identifying as cosmopolitan and using social media predict higher flight activity, indicating sensitivity to social norms. These insights underscore the need for social considerations in shaping effective policies to mitigate aviation emissions. 2) This study investigates consumer willingness to pay for reductions in greenhouse gas emissions in air travel. Through two studies involving 1192 participants, scenarios of commercial flight offering 10–50% reductions were presented. Participants were asked about their willingness to pay an additional 5%, 10%, or 15% increase in ticket prices for each reduction increment. Results show a positive correlation between greenhouse gas reductions and willingness to pay, with women exhibiting higher willingness, especially for shorter domestic flights. 3) This thesis identifies three key sustainable practices in aviation: organizational initiatives, sustainable aviation fuels, and technological innovation. Passenger willingness to pay is highest for sustainable fuels and technological advancements, aligning with expert views that these areas are crucial for decarbonizing aviation. Airlines should prioritize investments in these two sectors for maximum passenger acceptance and revenue. 4) The study examines factors influencing attitudes towards discretionary air travel in the context of increasing climate concern. Using Katz's attitude functions theory, it identifies utilitarian, value-expressive, and social- adjustive functions as key drivers of air travel attitudes among Australian travelers. The ego-defense function, typically dormant, becomes active when climate change is directly addressed, serving to protect other attitude functions. The insights gained from this research are particularly relevant in the post-COVID aviation landscape, emphasizing the urgency of building a climate-safe future. 5) The study explores if passengers are willing to pay more for sustainable aviation and identifies factors influencing this willingness. It finds that caring and happiness mediate the relationship between sustainability knowledge and willingness to pay, suggesting emotions and concern for sustainability are key drivers. 6) This study investigates the public's willingness to pay (WTP) for low carbon jet fuels (LCJF) as an alternative to conventional jet fuels for reducing aviation emissions. Through an online survey of UK citizens who fly at least once a year (N = 1008), the study identifies three factors influencing WTP: social trust, perceived risks, and attitude. While there's a positive perception of the benefits of LCJF over associated risks, awareness of LCJF user remains low. Despite a favorable attitude, the majority of respondents are unwilling to pay more for carbon-neutral air travel. The research expands understanding	1) Verify results with another sample/study 2) Replicate findings to provide a more precise assessment of effect sizes and to increase validity of the study 3) Closer investigation of the underlying drivers and barriers behind passengers' decision to pay extra for a sustainable flight ticket 4) Verify results with another study in another region 5) Expand the accessible population to increase the generalizability of the findings 6) Verify results with another study in another region
2	**What factors hinder you from supporting sustainable air travel? (multiple choice question with a text field at the end for more options)**	To determine the barriers or challenges that prevent passengers from choosing sustainable air travel options. Understanding these constraints can guide efforts to remove obstacles or address concerns.	Alexander Gerich (2021). Is Sustainable Aviation Ready for Take-Off? An Analysis of Airline Initiatives and Passenger Views on Sustainable Business Practices in the Aviation Industry. Nova School of Business and Economics. https://run.unl.pt/bitstream/10362/142626/1/2021-22_fall_44130_alexander-gerich.pdf	This thesis identifies three key sustainable practices in aviation: organizational initiatives, sustainable aviation fuels, and technological innovation. Passenger willingness to pay is highest for sustainable fuels and technological advancements, aligning with expert views that these areas are crucial for decarbonizing aviation. Airlines should prioritize investments in these two sectors for maximum passenger acceptance and revenue.	Closer investigation of the underlying drivers and barriers behind passengers' decision to pay extra for a sustainable flight ticket
3	**How often do you travel by air? (multiple choice question with one option to choose from)**	To assess the frequency of air travel among respondents, which may correlate with their awareness, willingness, or ability to support sustainable options. Frequent flyers may have different attitudes or behaviors compared to infrequent travelers when it comes to sustainable aviation.	Lisa Oswald & Andreas Ernst (2021). Flying in the Face of Climate Change: Quantitative psychological approach examining the social drivers of individual air travel, Journal of Sustainable Tourism, 29:1, 68-86, https://doi.org/10.1080/09669582.2020.1812616	This paper explores how individual behavior, technological improvements, and policies can reduce emissions in aviation, a significant contributor to climate change. Through online surveys, it examines social influences on air travel using new instruments. Findings show that environmental awareness prompts engagement with carbon offsets, while global social connections lead to increased travel. Additionally, identifying as cosmopolitan and using social media predict higher flight activity, indicating sensitivity to social norms. These insights underscore the need for social considerations in shaping effective policies to mitigate aviation emissions.	Verify results with another sample/study
4	**Do you think that frequent flyers should be more responsible in supporting sustainable aviation options? (Yes/No)**	To evaluate participant's opinion on whether frequent flyers should take greater accountability for their environmental impact. This insight could help shape policies or initiatives aimed at encouraging more sustainable behaviors among high-frequency travelers.	Lisa Oswald & Andreas Ernst (2021). Flying in the Face of Climate Change: Quantitative psychological approach examining the social drivers of individual air travel, Journal of Sustainable Tourism, 29:1, 68-86, https://doi.org/10.1080/09669582.2020.1812616	This paper explores how individual behavior, technological improvements, and policies can reduce emissions in aviation, a significant contributor to climate change. Through online surveys, it examines social influences on air travel using new instruments. Findings show that environmental awareness prompts engagement with carbon offsets, while global social connections lead to increased travel. Additionally, identifying as cosmopolitan and using social media predict higher flight activity, indicating sensitivity to social norms. These insights underscore the need for social considerations in shaping effective policies to mitigate aviation emissions.	Verify results with another sample/study
5	**How aware are you of sustainability and sustainable air travel options? (4-point Likert Scale)**	To measure the level of awareness about sustainability and specific sustainable air travel options. This helps to identify knowledge gaps that could be addressed through education or awareness campaigns.	1) Amicarelli, V., Patruno, A., Bux, C. and Laglioia, G. (2021). 'Passengers' perception on aviation environmental issues and its effect on sustainable tourism', Int. J. Digital Culture and Electronic Tourism, Vol. 3, Nos. 3/4, pp.382–400, https://doi.org/10.1504/IJDCET.2021.116479 2) BingXua, Salman Ahmad, Vincent Charles, Jin Xuan (2022). Sustainable commercial aviation: What determines air travelers' willingness to pay more for sustainable aviation fuel? Journal of Cleaner Production, 374, https://doi.org/10.1016/j.jclepro.2022.133990	1) The study focuses on the importance of passenger knowledge in influencing their perception of aviation environmental issues and their impact on airline choice. Conducted through interviews at Bari Karol Wojtyła Airport, it examines Italian and foreign passengers' characteristics and attitudes toward aviation environmental topics. Findings reveal that flight tourists are generally uninformed, uninterested in aviation environmental policies, and reluctant to pay for measures enhancing aviation sustainability, such as online carbon offset or more expensive tickets for sustainable jet fuels. The study suggest s that enhancing flight tourists' environmental awareness could help achieve sustainable tourism goals. 2) This study investigates the public's willingness to pay (WTP) for low carbon jet fuels (LCJF) as an alternative to conventional jet fuels for reducing aviation emissions. Through an online survey of UK citizens who fly at least once a year (N = 1008), the study identifies three factors influencing WTP: social trust, perceived risks, and attitude. While there's a positive perception of the benefits of LCJF over associated risks, awareness of LCJF user remains low. Despite a favorable attitude, the majority of respondents are unwilling to pay more for carbon-neutral air travel. The research expands understanding of LCJF acceptance and WTP debates and suggest s leveraging key factors to enhance LCJF acceptability through informed campaigns by public and corporate managers.	1) Verify results in other regions 2) Verify results with another study in a different region
6	**Do you believe that increased awareness of sustainable air travel options would make you more likely to support them? (Yes/No)**	To explore the perceived impact of awareness on behavioral change, particularly whether greater knowledge about sustainability would lead to increased support for eco-friendly flights.	1) Amicarelli, V., Patruno, A., Bux, C. and Laglioia, G. (2021). 'Passengers' perception on aviation environmental issues and its effect on sustainable tourism', Int. J. Digital Culture and Electronic Tourism, Vol. 3, Nos. 3/4, pp.382–400, https://doi.org/10.1504/IJDCET.2021.116479 2) Nadine K. Ragbir, Stephen Rice, Scott R. Winter, Elaine C. Choy (2021). Emotions and caring mediate the relationship between knowledge of sustainability and willingness to pay for greener aviation, Technology in Society, 64, https://doi.org/10.1016/j.techsoc.2020.101491	1) The study focuses on the importance of passenger knowledge in influencing their perception of aviation environmental issues and their impact on airline choice. Conducted through interviews at Bari Karol Wojtyła Airport, it examines Italian and foreign passengers' characteristics and attitudes toward aviation environmental topics. Findings reveal that flight tourists are generally uninformed, uninterested in aviation environmental policies, and reluctant to pay for measures enhancing aviation sustainability, such as online carbon offset or more expensive tickets for sustainable jet fuels. The study suggest s that enhancing flight tourists' environmental awareness could help achieve sustainable tourism goals. 2) The study explores if passengers are willing to pay more for sustainable aviation and identifies factors influencing this willingness. It finds that caring and happiness mediate the relationship between sustainability knowledge and willingness to pay, suggesting emotions and concern for sustainability are key drivers.	1) Verify results in other regions 2) Expand the accessible population to increase the generalizability of the findings
7	**How willing are you to pay more for an environmentally friendly flight? (4-point Likert Scale)**	To assess the willingness of passengers to bear higher costs for sustainability, which is crucial for understanding the market potential for sustainable air travel and the financial trade-offs passengers are willing to make.	1) Amicarelli, V., Patruno, A., Bux, C. and Laglioia, G. (2021). 'Passengers' perception on aviation environmental issues and its effect on sustainable tourism', Int. J. Digital Culture and Electronic Tourism, Vol. 3, Nos. 3/4, pp.382–400, https://doi.org/10.1504/IJDCET.2021.116479 2) Connor Rice, Nadine K. Ragbir, Stephen Rice, Gina Barcia (2020). Willingness to pay for sustainable aviation depends on ticket price, greenhouse gas reductions and gender, Technology in Society, 60, https://doi.org/10.1016/j.techsoc.2019.101224 3) Alexander Gerich (2021). Is Sustainable Aviation Ready for Take-Off? An Analysis of Airline Initiatives and Passenger Views on Sustainable Business Practices in the Aviation Industry. Nova School of Business and Economics. https://run.unl.pt/bitstream/10362/142626/1/2021-22_fall_44130_alexander-gerich.pdf 4) Neelu Seetaram, Haiyan Song, Shun Ye, Stephen Page (2018). Estimating willingness to pay air passenger duty, Annals of Tourism Research, 72, https://doi.org/10.1016/j.annals.2018.07.001 5) BingXua, Salman Ahmad, Vincent Charles, Jin Xuan (2022). Sustainable commercial aviation: What determines air travelers' willingness to pay more for sustainable aviation fuel? Journal of Cleaner Production, 374, https://doi.org/10.1016/j.jclepro.2022.133990	1) The study focuses on the importance of passenger knowledge in influencing their perception of aviation environmental issues and their impact on airline choice. Conducted through interviews at Bari Karol Wojtyła Airport, it examines Italian and foreign passengers' characteristics and attitudes toward aviation environmental topics. Findings reveal that flight tourists are generally uninformed, uninterested in aviation environmental policies, and reluctant to pay for measures enhancing aviation sustainability, such as online carbon offset or more expensive tickets for sustainable jet fuels. The study suggest s that enhancing flight tourists' environmental awareness could help achieve sustainable tourism goals. 2) This study investigates consumer willingness to pay for reductions in greenhouse gas emissions in air travel. Through two studies involving 1192 participants, scenarios of commercial flight offering 10–50% reductions were presented. Participants were asked about their willingness to pay an additional 5%, 10%, or 15% increase in ticket prices for each reduction increment. Results show a positive correlation between greenhouse gas reductions and willingness to pay, with women exhibiting higher willingness, especially for shorter domestic flights. 3) This thesis identifies three key sustainable practices in aviation: organizational initiatives, sustainable aviation fuels, and technological innovation. Passenger willingness to pay is highest for sustainable fuels and technological advancements, aligning with expert views that these areas are crucial for decarbonizing aviation. Airlines should prioritize investments in these two sectors for maximum passenger acceptance and revenue. 4) The study examines UK outbound travelers' willingness to pay for the air passenger duty (APD) levied by the UK government and derives demand curves across various trip scenarios. It finds that travelers are willing to pay more for business class and long-haul trips, with all demand curves showing a downward slope. These findings offer insights into the effectiveness of carbon taxation in adjusting tourist flows and offsetting environmental externalities. 5) This study investigates the public's willingness to pay (WTP) for low carbon jet fuels (LCJF) as an alternative to conventional jet fuels for reducing aviation emissions. Through an online survey of UK citizens who fly at least once a year (N = 1008), the study identifies three factors influencing WTP: social trust, perceived risks, and attitude. While there's a positive perception of the benefits of LCJF over associated risks, awareness of LCJF user remains low. Despite a favorable attitude, the majority of respondents are unwilling to pay more for carbon-neutral air travel. The research expands understanding of LCJF acceptance and WTP debates and suggest s leveraging key factors to enhance LCJF acceptability through informed campaigns by public and corporate managers.	1) Verify results in other regions 2) Replicate findings to provide a more precise assessment of effect sizes and to increase validity of the study 3) Verify results with another sample/study 4) Verify results with another study and with a different population 5) Verify results with another study in a different region
8	**Demographic Questions (gender, age group, nationality, level of education, monthly household income)**	To collect demographic data to analyze trends and patterns in attitudes toward sustainable air travel across different demographic groups. This information can help in tailoring interventions or marketing strategies to specific populations.	All of the papers mentioned above	All of the papers mentioned above	Examine this for different demographics

Timestamp	What factors motivate you to support sustainable air travel?	Number of Motivations	What factors hinder you from supporting sustainable air travel?	Number of Constraints	Frequency	Do you think that frequent flyers should be more	Sustainability Awareness
9.16.2024 11:15:06	Reducing carbon footprint, Preserving the environment for future generations, Improved air quality, Reduced noise pollution, Supporting airlines that prioritize sustainability, Investing in new and eco-friendly technologies, Commitment to sustainability and ethical travel choices	7	Limited availability of sustainable flights, Lack of awareness regarding sustainable options, Insufficient information on eco-friendly options	3	2	Yes	2
9.16.2024 14:10:59	Reducing carbon footprint, Preserving the environment for future generations, Improved air quality, Commitment to sustainability and ethical travel choices	4	Limited availability of sustainable flights, Difficulty in finding and booking sustainable flights, Lack of awareness regarding sustainable options, Skepticism about the impact of sustainable practices	4	3	Yes	2
9.16.2024 16:22:15	Reducing carbon footprint, Preserving the environment for future generations, Reduced noise pollution, Commitment to sustainability and ethical travel choices	4	Higher costs, Lack of awareness regarding sustainable options, Insufficient information on eco-friendly options	3	3	Yes	3
9.16.2024 18:08:15	Reducing carbon footprint, Preserving the environment for future generations, Improved air quality	3	Higher costs, Limited availability of sustainable flights, Insufficient information on eco-friendly options	3	2	Yes	2
9.17.2024 11:33:12	Commitment to sustainability and ethical travel choices	1	Insufficient information on eco-friendly options	1	3	Yes	2
9.17.2024 16:10:43	Preserving the environment for future generations, Improved air quality, Investing in new and eco-friendly technologies, Commitment to sustainability and ethical travel choices	4	Higher costs, Difficulty in finding and booking sustainable flights, Lack of awareness regarding sustainable options, Insufficient information on eco-friendly options, Prioritizing other travel factors over sustainability	5	2	No	2
9.17.2024 22:19:24	Preserving the environment for future generations, Supporting airlines that prioritize sustainability	2	Insufficient information on eco-friendly options, Skepticism about the impact of sustainable practices	2	3	Yes	2
9.18.2024 7:33:00	Reducing carbon footprint, Improved air quality, Reduced noise pollution, Investing in new and eco-friendly technologies, Commitment to sustainability and ethical travel choices	5	Higher costs, Limited availability of sustainable flights, Difficulty in finding and booking sustainable flights, Lack of awareness regarding sustainable options, Skepticism about the impact of sustainable practices	5	5	Yes	4
9.18.2024 14:12:56	Reducing carbon footprint	1	Higher costs, Insufficient information on eco-friendly options	2	3	Yes	2
9.18.2024 20:37:02	Reducing carbon footprint, Preserving the environment for future generations, Improved air quality, Investing in new and eco-friendly technologies, Commitment to sustainability and ethical travel choices	5	Limited availability of sustainable flights, Difficulty in finding and booking sustainable flights, Lack of awareness regarding sustainable options, Insufficient information on eco-friendly options, Skepticism about the impact of sustainable practices	5	2	Yes	3
9.19.2024 3:59:06	Preserving the environment for future generations, Improved air quality, Reduced noise pollution, Supporting airlines that prioritize sustainability, Investing in new and eco-friendly technologies, Supporting true sustainability not motivated by financial markets, including carbon offset schemes	6	Insufficient information on eco-friendly options, Skepticism about the impact of sustainable practices, There are very few truly sustainable options thus far. Carbon offset programs and trading schemes do not change the environment over the long term	3	5	Yes	3
9.19.2024 9:41:03	Reducing carbon footprint, Improved air quality, Reduced noise pollution, Supporting airlines that prioritize sustainability	4	Higher costs, Lack of awareness regarding sustainable options, Insufficient information on eco-friendly options, Prioritizing other travel factors over sustainability	4	2	Yes	1
9.19.2024 12:21:54	Reducing carbon footprint, Reduced noise pollution, Supporting airlines that prioritize sustainability, Investing in new and eco-friendly technologies	4	Limited availability of sustainable flights, Difficulty in finding and booking sustainable flights, Insufficient information on eco-friendly options	3	3	Yes	4
9.19.2024 12:27:14	Reducing carbon footprint, Preserving the environment for future generations, Improved air quality, Reduced noise pollution, Investing in new and eco-friendly technologies	5	Higher costs, Limited availability of sustainable flights, Difficulty in finding and booking sustainable flights, Insufficient information on eco-friendly options	4	2	Yes	3
9.19.2024 12:46:32	Reducing carbon footprint, Improved air quality	2	Higher costs, Difficulty in finding and booking sustainable flights, Lack of awareness regarding sustainable options	3	3	Yes	1
9.19.2024 12:48:55	Preserving the environment for future generations, Improved air quality, Supporting airlines that prioritize sustainability	3	Higher costs, Skepticism about the impact of sustainable practices, Prioritizing other travel factors over sustainability	3	3	No	3
9.19.2024 12:57:51	Improved air quality	1	Limited availability of sustainable flights	1	2	Yes	2
9.19.2024 13:18:14	Reducing carbon footprint, Preserving the environment for future generations, Improved air quality, Reduced noise pollution, Supporting airlines that prioritize sustainability, Investing in new and eco-friendly technologies, Commitment to sustainability and ethical travel choices	7	Limited availability of sustainable flights, Difficulty in finding and booking sustainable flights, Insufficient information on eco-friendly options	3	2	Yes	3
9.19.2024 13:18:32	Reducing carbon footprint, Preserving the environment for future generations, Improved air quality, Reduced noise pollution, Supporting airlines that prioritize sustainability, Investing in new and eco-friendly technologies, Commitment to sustainability and ethical travel choices	7	Higher costs, Lack of awareness regarding sustainable options, Insufficient information on eco-friendly options	3	2	Yes	2
9.19.2024 13:35:47	Preserving the environment for future generations	1	Higher costs	1	2	Yes	2
9.19.2024 14:15:56	Reducing carbon footprint, Reduced noise pollution, Supporting airlines that prioritize sustainability	3	Higher costs, Difficulty in finding and booking sustainable flights, Lack of awareness regarding sustainable options	3	2	Yes	2
9.19.2024 16:41:50	Reducing carbon footprint, Preserving the environment for future generations, Supporting airlines that prioritize sustainability, Commitment to sustainability and ethical travel choices	4	Higher costs, Difficulty in finding and booking sustainable flights, Insufficient information on eco-friendly options, Prioritizing other travel factors over sustainability	4	3	Yes	3
9.19.2024 17:32:23	Reducing carbon footprint, Preserving the environment for future generations, Commitment to sustainability and ethical travel choices	3	Limited availability of sustainable flights, Difficulty in finding and booking sustainable flights, Insufficient information on eco-friendly options, Skepticism about the impact of sustainable practices	4	2	Yes	3
9.19.2024 19:05:54	Commitment to sustainability and ethical travel choices	1	Higher costs	1	5	No	3
9.19.2024 19:10:13	Reducing carbon footprint, Preserving the environment for future generations, Improved air quality, Reduced noise pollution, Supporting airlines that prioritize sustainability, Investing in new and eco-friendly technologies, Commitment to sustainability and ethical travel choices	7	Limited availability of sustainable flights, Difficulty in finding and booking sustainable flights	2	4	Yes	4
9.19.2024 19:35:24	Reducing carbon footprint, Supporting airlines that prioritize sustainability, Investing in new and eco-friendly technologies	3	Higher costs, Limited availability of sustainable flights, Lack of awareness regarding sustainable options	3	3	No	2
9.19.2024 22:43:30	Reducing carbon footprint, Preserving the environment for future generations, Improved air quality	3	Higher costs, Limited availability of sustainable flights, Difficulty in finding and booking sustainable flights, Lack of awareness regarding sustainable options, Insufficient information on eco-friendly options, Skepticism about the impact of sustainable practices, Loyalty to non-sustainable airlines, Prioritizing other travel factors over sustainability	8	3	Yes	2
9.20.2024 6:01:44	Reducing carbon footprint, Preserving the environment for future generations, Improved air quality, Commitment to sustainability and ethical travel choices	4	Limited availability of sustainable flights, Difficulty in finding and booking sustainable flights, Lack of awareness regarding sustainable options, Insufficient information on eco-friendly options	4	3	Yes	4
9.20.2024 7:10:03	Preserving the environment for future generations, Reduced noise pollution, Investing in new and eco-friendly technologies, Commitment to sustainability and ethical travel choices	4	Limited availability of sustainable flights, Difficulty in finding and booking sustainable flights, Insufficient information on eco-friendly options	3	3	Yes	3
9.20.2024 16:14:52	Reducing carbon footprint, Preserving the environment for future generations, Improved air quality, Reduced noise pollution, Investing in new and eco-friendly technologies, Commitment to sustainability and ethical travel choices	6	Higher costs, Limited availability of sustainable flights, Difficulty in finding and booking sustainable flights, Lack of awareness regarding sustainable options, Skepticism about the impact of sustainable practices, Loyalty to non-sustainable airlines	6	5	Yes	3
9.20.2024 17:02:24	Preserving the environment for future generations, Improved air quality, Supporting airlines that prioritize sustainability, Investing in new and eco-friendly technologies	4	Higher costs, Limited availability of sustainable flights, Difficulty in finding and booking sustainable flights, Lack of awareness regarding sustainable options, Insufficient information on eco-friendly options, Prioritizing other travel factors over sustainability	6	4	Yes	2
9.21.2024 16:32:18	Reducing carbon footprint, Preserving the environment for future generations, Improved air quality, Reduced noise pollution, Investing in new and eco-friendly technologies	5	Higher costs, Lack of awareness regarding sustainable options, Insufficient information on eco-friendly options	3	3	Yes	1
9.21.2024 21:04:22	Reducing carbon footprint, Preserving the environment for future generations, Improved air quality, Reduced noise pollution, Commitment to sustainability and ethical travel choices	5	Higher costs	1	5	Yes	2
9.22.2024 1:32:44	Reducing carbon footprint, Preserving the environment for future generations, Improved air quality, Reduced noise pollution	4	Higher costs, Difficulty in finding and booking sustainable flights, Insufficient information on eco-friendly options	3	3	Yes	3
9.22.2024 9:05:03	Reducing carbon footprint, Preserving the environment for future generations, Improved air quality, Reduced noise pollution	4	Higher costs, Limited availability of sustainable flights, Loyalty to non-sustainable airlines	3	4	Yes	2
9.23.2024 10:59:17	Investing in new and eco-friendly technologies	1	Prioritizing other travel factors over sustainability	1	5	No	3
9.23.2024 13:03:47	Reducing carbon footprint, Preserving the environment for future generations, Improved air quality, Reduced noise pollution	4	Limited availability of sustainable flights, Difficulty in finding and booking sustainable flights, Insufficient information on eco-friendly options, Skepticism about the impact of sustainable practices	4	2	Yes	2
9.23.2024 14:44:38	Preserving the environment for future generations, Investing in new and eco-friendly technologies	2	Difficulty in finding and booking sustainable flights, Insufficient information on eco-friendly options	2	4	No	2
9.23.2024 15:14:49	Reducing carbon footprint, Preserving the environment for future generations	2	Higher costs, Difficulty in finding and booking sustainable flights	2	3	Yes	2
9.23.2024 15:30:31	Reducing carbon footprint, Preserving the environment for future generations	2	Higher costs, Limited availability of sustainable flights	2	3	Yes	3
9.23.2024 16:46:55	Preserving the environment for future generations, Improved air quality, Reduced noise pollution, Investing in new and eco-friendly technologies	4	Higher costs, Limited availability of sustainable flights, Difficulty in finding and booking sustainable flights, Skepticism about the impact of sustainable practices, Prioritizing other travel factors over sustainability	5	3	Yes	3
9.23.2024 17:10:44	Improved air quality, Reduced noise pollution, Supporting airlines that prioritize sustainability, Commitment to sustainability and ethical travel choices	4	Higher costs, Limited availability of sustainable flights, Lack of awareness regarding sustainable options, Insufficient information on eco-friendly options, Loyalty to non-sustainable airlines, Prioritizing other travel factors over sustainability	6	4	Yes	3
9.23.2024 17:42:15	Improved air quality, Reduced noise pollution, Investing in new and eco-friendly technologies	3	Higher costs, Limited availability of sustainable flights, Insufficient information on eco-friendly options, Skepticism about the impact of sustainable practices	4	3	Yes	1
9.23.2024 19:05:59	Reducing carbon footprint, Preserving the environment for future generations	2	Higher costs, Limited availability of sustainable flights, Difficulty in finding and booking sustainable flights, Insufficient information on eco-friendly options	4	3	Yes	1
9.23.2024 19:30:41	Reducing carbon footprint	1	Prioritizing other travel factors over sustainability	1	2	Yes	4
9.23.2024 19:34:21	Reducing carbon footprint	1	Prioritizing other travel factors over sustainability	1	2	Yes	2
9.23.2024 21:23:19	Reducing carbon footprint, Preserving the environment for future generations, Investing in new and eco-friendly technologies, Commitment to sustainability and ethical travel choices	4	Higher costs	1	3	No	3
9.23.2024 21:25:58	Reducing carbon footprint, Preserving the environment for future generations, Improved air quality, Investing in new and eco-friendly technologies	4	Higher costs, Limited availability of sustainable flights, Difficulty in finding and booking sustainable flights	3	3	No	2
9.23.2024 21:29:09	Reducing carbon footprint, Supporting airlines that prioritize sustainability, Investing in new and eco-friendly technologies, Commitment to sustainability and ethical travel choices	4	Higher costs, Difficulty in finding and booking sustainable flights, Lack of awareness regarding sustainable options	3	3	Yes	1
9.23.2024 21:48:08	Reducing carbon footprint, Preserving the environment for future generations, Improved air quality, Investing in new and eco-friendly technologies, Commitment to sustainability and ethical travel choices	5	Higher costs, Limited availability of sustainable flights, Lack of awareness regarding sustainable options	3	3	Yes	2
9.23.2024 21:59:35	Reducing carbon footprint, Improved air quality, Investing in new and eco-friendly technologies	3	Limited availability of sustainable flights, Difficulty in finding and booking sustainable flights, Skepticism about the impact of sustainable practices	3	3	Yes	4
9.24.2024 8:53:43	Reducing carbon footprint, Preserving the environment for future generations	2	Higher costs, Limited availability of sustainable flights, Difficulty in finding and booking sustainable flights, Lack of awareness regarding sustainable options, Insufficient information on eco-friendly options	5	3	Yes	1
9.24.2024 9:00:24	Reducing carbon footprint, Preserving the environment for future generations, Improved air quality	3	Higher costs	1	4	Yes	3
9.24.2024 9:00:32	Reducing carbon footprint, Preserving the environment for future generations, Improved air quality, Reduced noise pollution, Supporting airlines that prioritize sustainability, Investing in new and eco-friendly technologies, Commitment to sustainability and ethical travel choices	7	Limited availability of sustainable flights, Difficulty in finding and booking sustainable flights, Lack of awareness regarding sustainable options, Skepticism about the impact of sustainable practices	4	2	Yes	2
9.24.2024 9:07:21	Preserving the environment for future generations, Improved air quality, Reduced noise pollution	3	Higher costs, Skepticism about the impact of sustainable practices	2	2	Yes	2
9.24.2024 9:24:45	Preserving the environment for future generations, Improved air quality, Investing in new and eco-friendly technologies	3	Higher costs, Limited availability of sustainable flights, Difficulty in finding and booking sustainable flights	3	3	Yes	3
9.24.2024 9:46:07	Reducing carbon footprint, Preserving the environment for future generations, Improved air quality	3	Higher costs, Lack of awareness regarding sustainable options, Insufficient information on eco-friendly options, Skepticism about the impact of sustainable practices	4	2	Yes	2
9.24.2024 10:24:18	Reducing carbon footprint, Preserving the environment for future generations	2	Insufficient information on eco-friendly options, Skepticism about the impact of sustainable practices	2	3	Yes	3
9.24.2024 10:26:13	Preserving the environment for future generations, Improved air quality, Commitment to sustainability and ethical travel choices	3	Limited availability of sustainable flights, Lack of awareness regarding sustainable options, Skepticism about the impact of sustainable practices	3	3	Yes	1
9.24.2024 11:01:24	Preserving the environment for future generations	1	Higher costs, Difficulty in finding and booking sustainable flights, Insufficient information on eco-friendly options, Skepticism about the impact of sustainable practices	4	3	Yes	2
9.24.2024 11:05:55	Reducing carbon footprint, Preserving the environment for future generations, Supporting airlines that prioritize sustainability	3	Higher costs, Limited availability of sustainable flights, Difficulty in finding and booking sustainable flights, Lack of awareness regarding sustainable options, Insufficient information on eco-friendly options	5	3	Yes	2
9.24.2024 11:07:21	Reducing carbon footprint, Preserving the environment for future generations	2	Higher costs, Loyalty to non-sustainable airlines, Prioritizing other travel factors over sustainability	3	3	Yes	3
9.24.2024 11:55:43	Reducing carbon footprint, Improved air quality, Reduced noise pollution	3	Higher costs, Lack of awareness regarding sustainable options, Loyalty to non-sustainable airlines	3	3	No	1
9.24.2024 12:14:46	Reducing carbon footprint, Preserving the environment for future generations, Improved air quality, Supporting airlines that prioritize sustainability, Investing in new and eco-friendly technologies, Commitment to sustainability and ethical travel choices	6	Higher costs, Limited availability of sustainable flights, Prioritizing other travel factors over sustainability	3	3	Yes	3
9.24.2024 12:23:56	Reducing carbon footprint, Preserving the environment for future generations, Improved air quality, Commitment to sustainability and ethical travel choices	4	Higher costs, Limited availability of sustainable flights, Difficulty in finding and booking sustainable flights, Lack of awareness regarding sustainable options, Insufficient information on eco-friendly options	5	6	Yes	2
9.24.2024 12:53:46	Reducing carbon footprint, Preserving the environment for future generations, Supporting airlines that prioritize sustainability, Investing in new and eco-friendly technologies	4	Limited availability of sustainable flights, Insufficient information on eco-friendly options	2	5	Yes	2
9.24.2024 13:15:23	Reducing carbon footprint, Preserving the environment for future generations, Improved air quality, Commitment to sustainability and ethical travel choices	4	Higher costs, Difficulty in finding and booking sustainable flights, Lack of awareness regarding sustainable options, Insufficient information on eco-friendly options	4	3	Yes	1
9.24.2024 13:31:11	Reducing carbon footprint, Preserving the environment for future generations	2	Higher costs, Limited availability of sustainable flights, Lack of awareness regarding sustainable options	3	2	Yes	1
9.24.2024 15:09:22	Reducing carbon footprint, Improved air quality, Supporting airlines that prioritize sustainability	3	Higher costs, Insufficient information on eco-friendly options, Prioritizing other travel factors over sustainability	3	6	No	4
9.24.2024 16:51:37	Reducing carbon footprint, Preserving the environment for future generations, Improved air quality, Investing in new and eco-friendly technologies, Commitment to sustainability and ethical travel choices	5	Higher costs, Lack of awareness regarding sustainable options, Skepticism about the impact of sustainable practices	3	2	Yes	2
9.24.2024 17:52:01	Reducing carbon footprint, Preserving the environment for future generations, Commitment to sustainability and ethical travel choices	3	Limited availability of sustainable flights, Skepticism regarding impact and sustainability of CO2 compensation projetcs	2	2	Yes	3
9.24.2024 20:20:13	Reducing carbon footprint, Preserving the environment for future generations, Improved air quality, Reduced noise pollution, Investing in new and eco-friendly technologies, Commitment to sustainability and ethical travel choices	6	Higher costs, Limited availability of sustainable flights, Difficulty in finding and booking sustainable flights, Lack of awareness regarding sustainable options, Insufficient information on eco-friendly options	5	2	Yes	1
9.24.2024 21:23:46	Reduced noise pollution, Investing in new and eco-friendly technologies	2	Higher costs	1	2	Yes	2
9.24.2024 23:49:21	Reducing carbon footprint, Preserving the environment for future generations, Supporting airlines that prioritize sustainability, Investing in new and eco-friendly technologies, Commitment to sustainability and ethical travel choices	5	Higher costs, Difficulty in finding and booking sustainable flights, Lack of awareness regarding sustainable options, Insufficient information on eco-friendly options	4	3	Yes	2
9.25.2024 0:17:01	Reducing carbon footprint, Preserving the environment for future generations, Investing in new and eco-friendly technologies, Commitment to sustainability and ethical travel choices	4	Higher costs, Limited availability of sustainable flights, Lack of awareness regarding sustainable options, Skepticism about the impact of sustainable practices	4	3	Yes	3
9.25.2024 5:20:48	Reducing carbon footprint, Preserving the environment for future generations, Improved air quality, Supporting airlines that prioritize sustainability, Investing in new and eco-friendly technologies, Commitment to sustainability and ethical travel choices	6	Skepticism about the impact of sustainable practices	1	1	Yes	4
9.25.2024 10:10:12	Reducing carbon footprint, Improved air quality, Investing in new and eco-friendly technologies	3	Higher costs, Limited availability of sustainable flights	2	2	Yes	2
9.25.2024 12:25:47	Reducing carbon footprint, Preserving the environment for future generations, Reduced noise pollution	3	Higher costs, Limited availability of sustainable flights, Lack of awareness regarding sustainable options, Insufficient information on eco-friendly options	4	4	Yes	3
9.25.2024 12:31:12	Reducing carbon footprint, Investing in new and eco-friendly technologies	2	Insufficient information on eco-friendly options, Loyalty to non-sustainable airlines	2	3	No	1
9.25.2024 12:38:08	Investing in new and eco-friendly technologies	1	Higher costs, Difficulty in finding and booking sustainable flights	2	5	No	1
9.25.2024 12:54:24	Reducing carbon footprint, Preserving the environment for future generations, Improved air quality, Reduced noise pollution	4	Higher costs, Limited availability of sustainable flights	2	6	Yes	3
9.25.2024 13:11:50	Preserving the environment for future generations, Reduced noise pollution, Supporting airlines that prioritize sustainability	3	Higher costs, Lack of awareness regarding sustainable options, Insufficient information on eco-friendly options	3	3	Yes	2
9.25.2024 13:20:32	Preserving the environment for future generations, Investing in new and eco-friendly technologies	2	Higher costs, Lack of awareness regarding sustainable options	2	4	Yes	1
9.25.2024 13:25:29	Reducing carbon footprint, Preserving the environment for future generations, Improved air quality	3	Higher costs, Limited availability of sustainable flights, Difficulty in finding and booking sustainable flights, Insufficient information on eco-friendly options	4	2	No	2
9.25.2024 13:38:46	Preserving the environment for future generations, Improved air quality, Commitment to sustainability and ethical travel choices	3	Skepticism about the impact of sustainable practices	1	3	Yes	4
9.25.2024 13:45:01	Reducing carbon footprint, Improved air quality, Reduced noise pollution, Commitment to sustainability and ethical travel choices	4	Higher costs, Limited availability of sustainable flights	2	3	Yes	2
9.25.2024 17:05:41	Investing in new and eco-friendly technologies	1	Higher costs	1	3	No	1
9.25.2024 17:08:23	Preserving the environment for future generations, Improved air quality	2	Higher costs, Limited availability of sustainable flights, Lack of awareness regarding sustainable options, Prioritizing other travel factors over sustainability	4	3	Yes	2
9.25.2024 17:14:13	Reducing carbon footprint, Improved air quality, Investing in new and eco-friendly technologies	3	Higher costs, Limited availability of sustainable flights, Prioritizing other travel factors over sustainability	3	4	No	3
9.25.2024 18:29:03	Preserving the environment for future generations, Investing in new and eco-friendly technologies, Commitment to sustainability and ethical travel choices	3	Higher costs, Difficulty in finding and booking sustainable flights, Prioritizing other travel factors over sustainability	3	4	Yes	3
9.25.2024 19:21:35	Reducing carbon footprint, Preserving the environment for future generations, Commitment to sustainability and ethical travel choices	3	Higher costs, Limited availability of sustainable flights, Prioritizing other travel factors over sustainability	3	3	No	2
9.25.2024 19:33:35	Reducing carbon footprint, Preserving the environment for future generations	2	Higher costs, Limited availability of sustainable flights	2	3	Yes	2
9.25.2024 19:36:45	Reducing carbon footprint, Preserving the environment for future generations, Improved air quality, Investing in new and eco-friendly technologies, Commitment to sustainability and ethical travel choices	5	Higher costs, Limited availability of sustainable flights, Difficulty in finding and booking sustainable flights, Prioritizing other travel factors over sustainability	4	2	Yes	1
9.25.2024 20:06:26	Preserving the environment for future generations, Improved air quality, Reduced noise pollution	3	Difficulty in finding and booking sustainable flights, Insufficient information on eco-friendly options	2	2	Yes	2
9.25.2024 20:42:58	Preserving the environment for future generations, Improved air quality, Investing in new and eco-friendly technologies	3	Higher costs, Limited availability of sustainable flights	2	2	Yes	3
9.25.2024 22:33:30	Reduced noise pollution	1	Skepticism about the impact of sustainable practices	1	3	Yes	3
9.25.2024 22:54:52	Reducing carbon footprint, Preserving the environment for future generations, Improved air quality, Reduced noise pollution, Investing in new and eco-friendly technologies	5	Limited availability of sustainable flights, Difficulty in finding and booking sustainable flights, Insufficient information on eco-friendly options, Skepticism about the impact of sustainable practices, Prioritizing other travel factors over sustainability	5	2	Yes	2
9.26.2024 0:24:38	Preserving the environment for future generations	1	Insufficient information on eco-friendly options	1	2	Yes	2
9.26.2024 7:50:58	Preserving the environment for future generations, Investing in new and eco-friendly technologies	2	Higher costs	1	3	Yes	2
9.26.2024 8:59:33	Reducing carbon footprint, Reduced noise pollution, Supporting airlines that prioritize sustainability, Investing in new and eco-friendly technologies	4	Higher costs, Insufficient information on eco-friendly options, Skepticism about the impact of sustainable practices	3	5	No	4
9.26.2024 16:17:42	Reducing carbon footprint, Preserving the environment for future generations, Improved air quality, Reduced noise pollution, Investing in new and eco-friendly technologies, Commitment to sustainability and ethical travel choices	6	Difficulty in finding and booking sustainable flights, Lack of awareness regarding sustainable options, Insufficient information on eco-friendly options	3	2	Yes	2
9.26.2024 16:17:46	Reducing carbon footprint, Preserving the environment for future generations, Improved air quality, Reduced noise pollution, Supporting airlines that prioritize sustainability, Investing in new and eco-friendly technologies, Commitment to sustainability and ethical travel choices	7	Higher costs, Prioritizing other travel factors over sustainability	2	3	Yes	2
9.26.2024 16:18:00	Reducing carbon footprint, Preserving the environment for future generations, Improved air quality	3	Limited availability of sustainable flights, Lack of awareness regarding sustainable options, Insufficient information on eco-friendly options	3	3	No	2
9.26.2024 16:33:33	Investing in new and eco-friendly technologies	1	Higher costs, Skepticism about the impact of sustainable practices	2	3	No	1
9.26.2024 16:58:20	Reducing carbon footprint, Preserving the environment for future generations, Improved air quality, Reduced noise pollution	4	Higher costs, Difficulty in finding and booking sustainable flights	2	2	Yes	1
9.26.2024 16:59:47	Reducing carbon footprint, Preserving the environment for future generations, Improved air quality	3	Higher costs, Limited availability of sustainable flights, Lack of awareness regarding sustainable options, Prioritizing other travel factors over sustainability	4	4	Yes	3
9.26.2024 20:47:08	Reducing carbon footprint, Preserving the environment for future generations, Improved air quality	3	Higher costs, Lack of awareness regarding sustainable options, Skepticism about the impact of sustainable practices	3	4	Yes	1

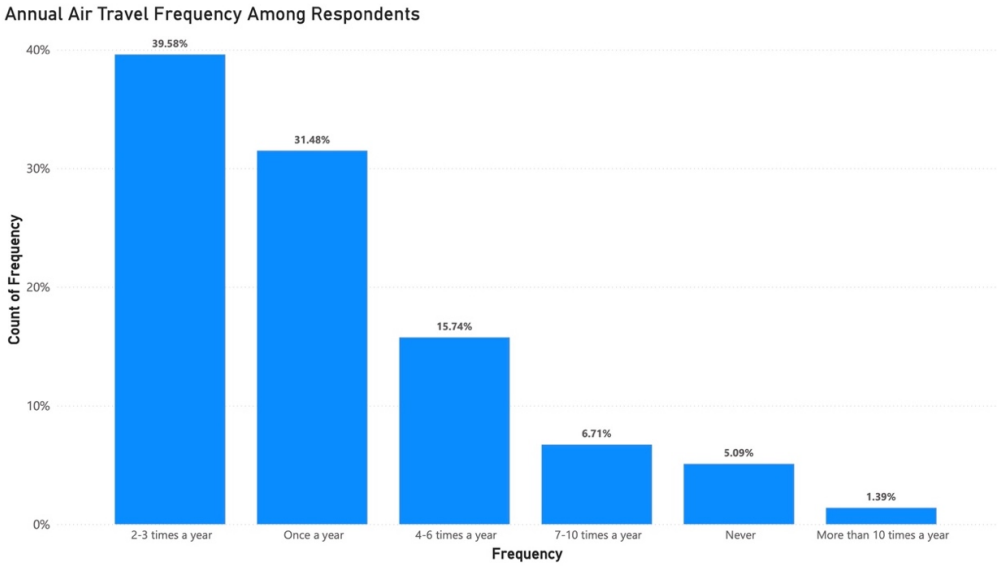
What sustainable air travel options have you heard of?	Do you believe that increased awareness of sus	Willingness to pay	For which type of flight would you be more inclin	Which sustainable aviation option	Gender	Age Group	Nationality	Education Level	Occupational Status	Income Level
Carbon offset programs, Green airports, Eco-friendly in-flight services, Noise reduction technologies	Yes	3	Long-haul	[illegible]	Male	30-39	Iran	Master's degree	Employed	1.000-1.999 €
Sustainable Aviation Fuels (SAF), Fuel-efficient aircraft, Reduced emission flight routes, Eco-friendly in-flight services	Yes	3	Long-haul	[illegible]	Male	30-39	India	Master's degree	Student	500-999 €
Carbon offset programs, Electric and hybrid aircraft, Reduced emission flight routes, Green airports, Eco-friendly in-flight services	Yes	3	Short-haul	[illegible]	Female	24-29	India	Master's degree	Student	3.000-3.999 €
Sustainable Aviation Fuels (SAF), Electric and hybrid aircraft, Green airports, Eco-friendly in-flight services	Yes	1	Long-haul	[illegible]	Female	50-59	Portugal	PhD/Doctorate	Employed	1.000-1.999 €
Carbon offset programs	Yes	3	Long-haul	[illegible]	Female	40-49	Italy	Master's degree	Employed	2.000-2.999 €
Fuel-efficient aircraft, Eco-friendly in-flight services	Yes	1	Long-haul	[illegible]	Male	18-23	United States	Bachelor's degree	Employed	1.000-1.999 €
Fuel-efficient aircraft	Yes	2	Short-haul	[illegible]	Female	50-59	Portugal	PhD/Doctorate	Employed	2.000-2.999 €
Carbon offset programs, Sustainable Aviation Fuels (SAF), Electric and hybrid aircraft, Fuel-efficient aircraft, Reduced emission flight routes, Green airports, Eco-friendly in-flight services, Noise reduction technologies, Sustainable airline partnerships	Yes	2	Long-haul	[illegible]	Female	40-49	Italy	PhD/Doctorate	Employed	2.000-2.999 €
Carbon offset programs	Yes	2	Long-haul	[illegible]	Female	40-49	Portugal	PhD/Doctorate	Employed	3.000-3.999 €
Carbon offset programs, Sustainable Aviation Fuels (SAF), Electric and hybrid aircraft	Yes	4	Long-haul	[illegible]	Female	24-29	Germany	Bachelor's degree	Student	500-999 €
Heard of all of the above, but not all are necessarily part of sustainability, even if they do stimulate conversations around the importance of sustainability.	No	2	Short-haul	[illegible]	Female	60-69	United States	PhD/Doctorate	Other	5.000-5.999 €
None of the above	Yes	2	Long-haul	[illegible]	Female	18-23	Portugal	Bachelor's degree	Student	Below 500 €
Sustainable Aviation Fuels (SAF), Reduced emission flight routes, Noise reduction technologies,	Yes	3	Long-haul	[illegible]	Female	40-49	Brazil	Master's degree	Student	7.000-7.999 €
Carbon offset programs, Sustainable Aviation Fuels (SAF), Fuel-efficient aircraft, Reduced emission flight routes, Noise reduction technologies	Yes	3	Long-haul	[illegible]	Female	30-39	Portugal	PhD/Doctorate	Employed	1.000-1.999 €
Eco-friendly in-flight services	No	2	Short-haul	[illegible]	Female	30-39	Portugal	PhD/Doctorate	Employed	1.000-1.999 €
Fuel-efficient aircraft, Reduced emission flight routes, Sustainable airline partnerships	Yes	1	Long-haul	[illegible]	Male	50-59	Brazil	PhD/Doctorate	Employed	2.000-2.999 €
Noise reduction technologies	No	2	Long-haul	[illegible]	Male	18-23	Italy	Master's degree	Student	Below 500 €
Carbon offset programs, Sustainable Aviation Fuels (SAF), Fuel-efficient aircraft, Reduced emission flight routes	Yes	3	Long-haul	[illegible]	Female	24-29	Portugal	Bachelor's degree	Employed	1.000-1.999 €
Carbon offset programs	No	2	Short-haul	[illegible]	Female	40-49	Portugal	PhD/Doctorate	Employed	1.000-1.999 €
Carbon offset programs, Fuel-efficient aircraft, Reduced emission flight routes	Yes	1	Short-haul	[illegible]	Female	24-29	Portugal	Master's degree	Student	1.000-1.999 €
Fuel-efficient aircraft, Green airports, Eco-friendly in-flight services, Noise reduction technologies	Yes	3	Short-haul	[illegible]	Male	18-23	Greece	Bachelor's degree	Student	500-999 €
Carbon offset programs, Sustainable Aviation Fuels (SAF), Fuel-efficient aircraft, Noise reduction technologies	Yes	3	Long-haul	[illegible]	Male	50-59	Germany	PhD/Doctorate	Employed	7.000-7.999 €
Carbon offset programs, Sustainable Aviation Fuels (SAF), Fuel-efficient aircraft, Green airports, Eco-friendly in-flight services, Noise reduction technologies	Yes	3	Long-haul	[illegible]	Female	40-49	Germany	PhD/Doctorate	Employed	Above 10.000 €
Carbon offset programs, Sustainable Aviation Fuels (SAF)	No	1	Short-haul	[illegible]	Male	50-59	Greece	PhD/Doctorate	Employed	3.000-3.999 €
Carbon offset programs, Sustainable Aviation Fuels (SAF), Fuel-efficient aircraft, Reduced emission flight routes, Green airports, Eco-friendly in-flight services, Sustainable airline partnerships	Yes	4	Short-haul	[illegible]	Female	50-59	Germany	PhD/Doctorate	Employed	9.000-9.999 €
Carbon offset programs	Yes	1	Long-haul	[illegible]	Female	24-29	Germany	PhD/Doctorate	Student	1.000-1.999 €
Carbon offset programs, Electric and hybrid aircraft, Reduced emission flight routes	Yes	2	Short-haul	[illegible]	Female	18-23	Croatia	Bachelor's degree	Student	500-999 €
Carbon offset programs, Sustainable Aviation Fuels (SAF), Electric and hybrid aircraft, Reduced emission flight routes, Green airports, Sustainable airline partnerships	Yes	4	Long-haul	[illegible]	Male	30-39	Zimbabwe	PhD/Doctorate	Employed	1.000-1.999 €
Electric and hybrid aircraft, Reduced emission flight routes, Sustainable airline partnerships	Yes	3	Short-haul	[illegible]	Male	50-59	Austria	Master's degree	Employed	7.000-7.999 €
Eco-friendly in-flight services	Yes	2	Short-haul	[illegible]	Female	18-23	Italy	Bachelor's degree	Student	1.000-1.999 €
Nenhuma	Yes	2	Short-haul	[illegible]	Male	24-29	Portugal	Master's degree	Other	1.000-1.999 €
Carbon offset programs	Yes	2	Long-haul	[illegible]	Female	18-23	Greece	Bachelor's degree	Student	Below 500 €
Eco-friendly in-flight services	Yes	2	Long-haul	[illegible]	Female	18-23	Colombia	High School degree	Student	500-999 €
Carbon offset programs, Sustainable Aviation Fuels (SAF), Electric and hybrid aircraft, Fuel-efficient aircraft, Reduced emission flight routes, Green airports, Eco-friendly in-flight services, Sustainable airline partnerships	Yes	3	Long-haul	[illegible]	Female	24-29	Guinea-Bissau	Master's degree	Employed	2.000-2.999 €
Electric and hybrid aircraft, Green airports, Eco-friendly in-flight services, Noise reduction technologies	Yes	2	Short-haul	[illegible]	Female	24-29	France	Master's degree	Student	500-999 €
Carbon offset programs, Sustainable Aviation Fuels (SAF), Electric and hybrid aircraft, Fuel-efficient aircraft, Noise reduction technologies	No	2	Short-haul	[illegible]	Male	50-59	Austria	Other	Self-Employed	Above 10.000 €
Electric and hybrid aircraft, Reduced emission flight routes	Yes	3	Short-haul	[illegible]	Female	24-29	Austria	Bachelor's degree	Student	1.000-1.999 €
Sustainable Aviation Fuels (SAF), Fuel-efficient aircraft, Eco-friendly in-flight services, Noise reduction technologies	Yes	2	Long-haul	[illegible]	Female	18-23	Austria	High School degree	Student	3.000-3.999 €
Reduced emission flight routes, Eco-friendly in-flight services	No	2	Long-haul	[illegible]	Female	60-69	Austria	Vocational Training/Apprenticeship	Retired	1.000-1.999 €
Sustainable Aviation Fuels (SAF), Reduced emission flight routes	Yes	3	Long-haul	[illegible]	Male	60-69	Austria	Vocational Training/Apprenticeship	Retired	1.000-1.999 €
Carbon offset programs, Sustainable Aviation Fuels (SAF), Electric and hybrid aircraft, Fuel-efficient aircraft, Reduced emission flight routes	Yes	2	Long-haul	[illegible]	Male	24-29	Austria	Master's degree	Employed	4.000-4.999 €
Sustainable Aviation Fuels (SAF), Electric and hybrid aircraft, Fuel-efficient aircraft, Green airports, Eco-friendly in-flight services, Noise reduction technologies, Sustainable airline partnerships	Yes	3	Short-haul	[illegible]	Female	18-23	India	Master's degree	Student	Below 500 €
none	Yes	3	Long-haul	[illegible]	Female	24-29	Germany	Bachelor's degree	Employed	4.000-4.999 €
Carbon offset programs, Electric and hybrid aircraft, Fuel-efficient aircraft, Reduced emission flight routes	Yes	3	Long-haul	[illegible]	Female	24-29	Germany	Bachelor's degree	Student	1.000-1.999 €
Carbon offset programs	Yes	1	Short-haul	[illegible]	Male	50-59	Italy	Master's degree	Employed	Below 500 €
Carbon offset programs	Yes	1	Short-haul	[illegible]	Female	60-69	Austria	Other	Retired	Below 500 €
Carbon offset programs, Electric and hybrid aircraft, Fuel-efficient aircraft	Yes	3	Long-haul	[illegible]	Female	30-39	Austria	Other	Employed	7.000-7.999 €
Carbon offset programs, Electric and hybrid aircraft, Fuel-efficient aircraft	No	2	Long-haul	[illegible]	Female	30-39	Austria	Master's degree	Employed	7.000-7.999 €
Fuel-efficient aircraft, Reduced emission flight routes, Sustainable airline partnerships	Yes	3	Long-haul	[illegible]	Male	30-39	Argentina	Master's degree	Employed	6.000-6.999 €
Carbon offset programs, Eco-friendly in-flight services, Sustainable airline partnerships	Yes	2	Short-haul	[illegible]	Female	50-59	Slovenia	PhD/Doctorate	Employed	2.000-2.999 €
Carbon offset programs, Reduced emission flight routes, Green airports, Eco-friendly in-flight services, Noise reduction technologies	Yes	3	Short-haul	[illegible]	Female	40-49	Portugal	PhD/Doctorate	Employed	2.000-2.999 €
Green airports	Yes	3	Long-haul	[illegible]	Female	30-39	Austria	Other	Employed	1.000-1.999 €
Carbon offset programs, Eco-friendly in-flight services, Noise reduction technologies	Yes	1	Short-haul	[illegible]	Female	24-29	Italy	Bachelor's degree	Student	Below 500 €
Sustainable Aviation Fuels (SAF), Eco-friendly in-flight services, Noise reduction technologies	Yes	2	Short-haul	[illegible]	Male	24-29	Germany	Master's degree	Employed	3.000-3.999 €
Reduced emission flight routes, Green airports	Yes	3	Long-haul	[illegible]	Female	24-29	Austria	Vocational Training/Apprenticeship	Employed	2.000-2.999 €
Fuel-efficient aircraft, Reduced emission flight routes, Eco-friendly in-flight services	Yes	2	Short-haul	[illegible]	Male	18-23	Austria	Vocational Training/Apprenticeship	Employed	1.000-1.999 €
Carbon offset programs, Electric and hybrid aircraft	Yes	2	Short-haul	[illegible]	Female	24-29	Austria	Bachelor's degree	Student	1.000-1.999 €
Carbon offset programs, Reduced emission flight routes	No	3	Long-haul	[illegible]	Female	50-59	Austria	High School degree	Employed	5.000-5.999 €
Fuel-efficient aircraft, Green airports	Yes	3	Long-haul	[illegible]	Female	40-49	Philippines	Master's degree	Employed	1.000-1.999 €
Fuel-efficient aircraft	No	1	Long-haul	[illegible]	Male	24-29	Austria	Bachelor's degree	Student	1.000-1.999 €
Carbon offset programs, Sustainable Aviation Fuels (SAF)	Yes	2	Short-haul	[illegible]	Female	24-29	Austria	Master's degree	Student	500-999 €
Carbon offset programs	Yes	2	Short-haul	[illegible]	Female	24-29	Austria	High School degree	Other	2.000-2.999 €
Noise reduction technologies	No	2	Long-haul	[illegible]	Male	18-23	Austria	Other	Student	Below 500 €
Carbon offset programs, Sustainable Aviation Fuels (SAF), Fuel-efficient aircraft, Reduced emission flight routes, Eco-friendly in-flight services	Yes	3	Short-haul	[illegible]	Female	30-39	Latvia	Master's degree	Employed	1.000-1.999 €
Reduced emission flight routes	Yes	3	Long-haul	[illegible]	Female	24-29	Austria	Bachelor's degree	Student	500-999 €
Carbon offset programs, Sustainable Aviation Fuels (SAF), Fuel-efficient aircraft, Sustainable airline partnerships	Yes	3	Long-haul	[illegible]	Female	40-49	Brazil	PhD/Doctorate	Student	1.000-1.999 €
Carbon offset programs, Electric and hybrid aircraft, Fuel-efficient aircraft, Reduced emission flight routes	Yes	2	Long-haul	[illegible]	Male	24-29	Austria	High School degree	Student	Below 500 €
Eco-friendly in-flight services, Noise reduction technologies	Yes	2	Long-haul	[illegible]	Female	24-29	Austria	High School degree	Student	500-999 €
Carbon offset programs, Sustainable Aviation Fuels (SAF), Electric and hybrid aircraft, Fuel-efficient aircraft, Reduced emission flight routes, Green airports, Eco-friendly in-flight services, Noise reduction technologies, Sustainable airline partnerships	No	3	Short-haul	[illegible]	Male	24-29	Austria	Bachelor's degree	Student	Below 500 €
Carbon offset programs, Green airports	Yes	2	Long-haul	[illegible]	Female	18-23	Netherlands	High School degree	Student	500-999 €
Carbon offset programs, Sustainable Aviation Fuels (SAF), Electric and hybrid aircraft, Fuel-efficient aircraft, Reduced emission flight routes, Eco-friendly in-flight services	Yes	3	Long-haul	[illegible]	Male	60-69	Germany	Master's degree	Retired	9.000-9.999 €
Electric and hybrid aircraft, Fuel-efficient aircraft	Yes	2	Long-haul	[illegible]	Male	50-59	Austria	High School degree	Employed	2.000-2.999 €
Electric and hybrid aircraft, Fuel-efficient aircraft, Eco-friendly in-flight services	Yes	2	Short-haul	[illegible]	Male	30-39	Austria	Other	Employed	3.000-3.999 €
Carbon offset programs, Sustainable Aviation Fuels (SAF), Reduced emission flight routes	Yes	2	Long-haul	[illegible]	Female	18-23	Germany	Bachelor's degree	Employed	1.000-1.999 €
Carbon offset programs, Electric and hybrid aircraft, Fuel-efficient aircraft, Reduced emission flight routes	Yes	3	Long-haul	[illegible]	Female	24-29	Germany	Bachelor's degree	Student	2.000-2.999 €
Sustainable Aviation Fuels (SAF)	Yes	4	Long-haul	[illegible]	Male	30-39	Austria	High School degree	Employed	4.000-4.999 €
Sustainable Aviation Fuels (SAF), Electric and hybrid aircraft	Yes	3	Long-haul	[illegible]	Male	24-29	Austria	High School degree	Employed	3.000-3.999 €
Carbon offset programs, Sustainable Aviation Fuels (SAF), Fuel-efficient aircraft, Reduced emission flight routes, Eco-friendly in-flight services	Yes	3	Long-haul	[illegible]	Male	24-29	Austria	Bachelor's degree	Employed	4.000-4.999 €
Sustainable Aviation Fuels (SAF), Fuel-efficient aircraft, Green airports, Eco-friendly in-flight services	No	2	Short-haul	[illegible]	Male	30-39	Germany	Bachelor's degree	Employed	5.000-5.999 €
Fuel-efficient aircraft, Green airports, Eco-friendly in-flight services	No	1	Long-haul	[illegible]	Female	24-29	Germany	Vocational Training/Apprenticeship	Employed	3.000-3.999 €
Carbon offset programs, Sustainable Aviation Fuels (SAF), Fuel-efficient aircraft, Green airports	Yes	3	Short-haul	[illegible]	Male	40-49	Portugal	Master's degree	Employed	5.000-5.999 €
Carbon offset programs, Fuel-efficient aircraft, Eco-friendly in-flight services	Yes	3	Short-haul	[illegible]	Male	40-49	Portugal	Master's degree	Employed	3.000-3.999 €
Fuel-efficient aircraft	Yes	2	Long-haul	[illegible]	Female	30-39	Kazakhstan	Master's degree	Employed	1.000-1.999 €
Sustainable Aviation Fuels (SAF), Fuel-efficient aircraft, Reduced emission flight routes, Sustainable airline partnerships	Yes	2	Long-haul	[illegible]	Female	24-29	Austria	High School degree	Employed	2.000-2.999 €
Fuel-efficient aircraft, Eco-friendly in-flight services	Yes	3	Long-haul	[illegible]	Male	24-29	Portugal	Master's degree	Employed	1.000-1.999 €
Carbon offset programs, Electric and hybrid aircraft, Fuel-efficient aircraft, Sustainable airline partnerships	Yes	1	Long-haul	[illegible]	Male	24-29	Germany	Bachelor's degree	Student	Below 500 €
Electric and hybrid aircraft, Eco-friendly in-flight services, Noise reduction technologies	No	1	Long-haul	[illegible]	Female	24-29	Switzerland	Bachelor's degree	Student	5.000-5.999 €
Fuel-efficient aircraft, Reduced emission flight routes, Sustainable airline partnerships	No	1	Short-haul	[illegible]	Female	24-29	Switzerland	Bachelor's degree	Student	5.000-5.999 €
Carbon offset programs, Sustainable Aviation Fuels (SAF), Electric and hybrid aircraft, Fuel-efficient aircraft, Reduced emission flight routes, Sustainable airline partnerships	Yes	1	Long-haul	[illegible]	Male	24-29	Austria	Vocational Training/Apprenticeship	Employed	4.000-4.999 €
Carbon offset programs, Sustainable Aviation Fuels (SAF), Reduced emission flight routes	Yes	2	Long-haul	[illegible]	Female	24-29	France	Master's degree	Employed	3.000-3.999 €
Electric and hybrid aircraft, Reduced emission flight routes, Noise reduction technologies	No	2	Long-haul	[illegible]	Female	18-23	Italy	Bachelor's degree	Student	Below 500 €
Carbon offset programs, Eco-friendly in-flight services	Yes	2	Long-haul	[illegible]	Male	24-29	Spain	Master's degree	Employed	2.000-2.999 €
Nothing	Yes	2	Short-haul	[illegible]	Female	18-23	Colombia	Bachelor's degree	Student	Below 500 €
Electric and hybrid aircraft	Yes	3	Long-haul	[illegible]	Female	Younger than 18	Colombia	High School degree	Student	Below 500 €
Electric and hybrid aircraft, Fuel-efficient aircraft, Reduced emission flight routes	Yes	2	Long-haul	[illegible]	Male	24-29	Germany	Bachelor's degree	Employed	4.000-4.999 €
Green airports	No	2	Long-haul	[illegible]	Male	24-29	India	Master's degree	Student	1.000-1.999 €
Sustainable Aviation Fuels (SAF), Electric and hybrid aircraft, Fuel-efficient aircraft, Reduced emission flight routes	Yes	3	Long-haul	[illegible]	Male	24-29	Germany	Bachelor's degree	Self-Employed	6.000-6.999 €
Sustainable Aviation Fuels (SAF), Reduced emission flight routes	Yes	3	Long-haul	[illegible]	Female	18-23	Portugal	High School degree	Student	500-999 €
Green airports	Yes	1	Long-haul	[illegible]	Female	24-29	Austria	Other	Employed	3.000-3.999 €
Carbon offset programs, Sustainable Aviation Fuels (SAF), Electric and hybrid aircraft, Fuel-efficient aircraft, Green airports, Eco-friendly in-flight services, Noise reduction technologies	No	2	Short-haul	[illegible]	Male	50-59	Germany	Other	Employed	Above 10.000 €
Carbon offset programs	Yes	4	Short-haul	[illegible]	Female	30-39	Portugal	Master's degree	Employed	Below 500 €
Carbon offset programs, Electric and hybrid aircraft, Fuel-efficient aircraft	Yes	1	Long-haul	[illegible]	Male	18-23	Portugal	Bachelor's degree	Employed	1.000-1.999 €
Green airports	Yes	2	Short-haul	[illegible]	Female	24-29	Belgium	Master's degree	Student	1.000-1.999 €
Carbon offset programs, Fuel-efficient aircraft, Noise reduction technologies	Yes	2	Short-haul	[illegible]	Male	30-39	Germany	Master's degree	Employed	4.000-4.999 €
Carbon offset programs	Yes	2	Short-haul	[illegible]	Female	30-39	Portugal	Bachelor's degree	Employed	1.000-1.999 €
Carbon offset programs, Sustainable Aviation Fuels (SAF), Reduced emission flight routes, Eco-friendly in-flight services, Sustainable airline partnerships	Yes	2	Short-haul	[illegible]	Female	40-49	United States	Master's degree	Employed	4.000-4.999 €
Carbon offset programs, Reduced emission flight routes	Yes	2	Short-haul	[illegible]	Female	18-23	United States	Bachelor's degree	Employed	2.000-2.999 €

Carbon offset programs, Sustainable Aviation Fuels (SAF)	Yes	3	Long-haul	Sustainable Aviation Fuels (SAF): airlines use biofuels or other alternative fuels that produce fewer carbon emissions compared to conventional jet fuel., Electric and hybrid aircraft: emerging technologies that involve electric or hybrid-powered planes to reduce or eliminate fossil fuel consumption., Fuel-efficient aircraft: airlines investing in newer, more fuel-efficient aircraft that consume less fuel and produce fewer emissions per passenger., Reduced emission flight routes: airlines optimize flight paths to reduce fuel consumption and emissions, often through better air traffic management., Eco-friendly in-flight services: airlines reducing single-use plastics, offering locally sourced food, and minimizing waste during flights.	Female	18-23	Germany	High School degree	Student	1.000-1.999 €
Carbon offset programs, Noise reduction technologies	Yes	2	Short-haul	Electric and hybrid aircraft: emerging technologies that involve electric or hybrid-powered planes to reduce or eliminate fossil fuel consumption., Fuel-efficient aircraft: airlines investing in newer, more fuel-efficient aircraft that consume less fuel and produce fewer emissions per passenger.	Male	18-23	Netherlands	Master's degree	Student	Below 500 €
Carbon offset programs, Noise reduction technologies	Yes	2	Short-haul	Carbon offset programs: passengers can pay to offset the carbon emissions of their flights by funding environmental projects, such as reforestation or renewable energy initiatives., Sustainable Aviation Fuels (SAF): airlines use biofuels or other alternative fuels that produce fewer carbon emissions compared to conventional jet fuel., Sustainable airline partnerships: collaborations between airlines and environmental organizations to promote and implement sustainable practices in aviation.	Male	18-23	Netherlands	Master's degree	Student	Below 500 €
Reduced emission flight routes, Eco-friendly in-flight services, Sustainable airline partnerships	Yes	2	Long-haul	Carbon offset programs: passengers can pay to offset the carbon emissions of their flights by funding environmental projects, such as reforestation or renewable energy initiatives., Eco-friendly in-flight services: airlines reducing single-use plastics, offering locally sourced food, and minimizing waste during flights.	Female	24-29	Netherlands	Bachelor's degree	Student	Below 500 €
Electric and hybrid aircraft, Fuel-efficient aircraft	Yes	2	Short-haul	Carbon offset programs: passengers can pay to offset the carbon emissions of their flights by funding environmental projects, such as reforestation or renewable energy initiatives., Electric and hybrid aircraft: emerging technologies that involve electric or hybrid-powered planes to reduce or eliminate fossil fuel consumption., Reduced emission flight routes: airlines optimize flight paths to reduce fuel consumption and emissions, often through better air traffic management., Green airports: airports adopting sustainable practices, such as using renewable energy, reducing waste, and improving ground operations to minimize environmental impact.	Female	18-23	Korea South	Bachelor's degree	Student	Below 500 €
None	Yes	4	Long-haul	Reduced emission flight routes: airlines optimize flight paths to reduce fuel consumption and emissions, often through better air traffic management., Green airports: airports adopting sustainable practices, such as using renewable energy, reducing waste, and improving ground operations to minimize environmental impact., Eco-friendly in-flight services: airlines reducing single-use plastics, offering locally sourced food, and minimizing waste during flights., Noise reduction technologies: adoption of technologies and flight procedures that minimize noise pollution, which can be a component of broader environmental sustainability efforts., Sustainable airline partnerships: collaborations between airlines and environmental organizations to promote and implement sustainable practices in aviation.	Female	18-23	United States	High School degree	Unemployed	6.000-6.999 €
Carbon offset programs	Yes	2	Long-haul	Carbon offset programs: passengers can pay to offset the carbon emissions of their flights by funding environmental projects, such as reforestation or renewable energy initiatives., Fuel-efficient aircraft: airlines investing in newer, more fuel-efficient aircraft that consume less fuel and produce fewer emissions per passenger., Reduced emission flight routes: airlines optimize flight paths to reduce fuel consumption and emissions, often through better air traffic management., Eco-friendly in-flight services: airlines reducing single-use plastics, offering locally sourced food, and minimizing waste during flights.	Female	18-23	United Kingdom	Bachelor's degree	Student	Below 500 €
Carbon offset programs,	Yes	1	Short-haul	Carbon offset programs: passengers can pay to offset the carbon emissions of their flights by funding environmental projects, such as reforestation or renewable energy initiatives., Sustainable Aviation Fuels (SAF): airlines use biofuels or other alternative fuels that produce fewer carbon emissions compared to conventional jet fuel., Electric and hybrid aircraft: emerging technologies that involve electric or hybrid-powered planes to reduce or eliminate fossil fuel consumption., Fuel-efficient aircraft: airlines investing in newer, more fuel-efficient aircraft that consume less fuel and produce fewer emissions per passenger., Reduced emission flight routes: airlines optimize flight paths to reduce fuel consumption and emissions, often through better air traffic management., Green airports: airports adopting sustainable practices, such as using renewable energy, reducing waste, and improving ground operations to minimize environmental impact., Eco-friendly in-flight services: airlines reducing single-use plastics, offering locally sourced food, and minimizing waste during flights., Noise reduction technologies: adoption of technologies and flight procedures that minimize noise pollution, which can be a component of broader environmental sustainability efforts., Sustainable airline partnerships: collaborations between airlines and environmental organizations to promote and implement sustainable practices in aviation.	Female	24-29	Pakistan	Bachelor's degree	Student	Below 500 €
Carbon offset programs,	Yes	1	Short-haul	Carbon offset programs: passengers can pay to offset the carbon emissions of their flights by funding environmental projects, such as reforestation or renewable energy initiatives.	Female	24-29	Pakistan	Bachelor's degree	Student	Below 500 €
Electric and hybrid aircraft, Fuel-efficient aircraft, Reduced emission flight routes, Eco-friendly in-flight services	Yes	3	Short-haul	Carbon offset programs: passengers can pay to offset the carbon emissions of their flights by funding environmental projects, such as reforestation or renewable energy initiatives., Electric and hybrid aircraft: emerging technologies that involve electric or hybrid-powered planes to reduce or eliminate fossil fuel consumption., Eco-friendly in-flight services: airlines reducing single-use plastics, offering locally sourced food, and minimizing waste during flights.	Female	30-39	Taiwan	Master's degree	Student	1.000-1.999 €
Fuel-efficient aircraft, Reduced emission flight routes	Yes	2	Short-haul	Sustainable Aviation Fuels (SAF): airlines use biofuels or other alternative fuels that produce fewer carbon emissions compared to conventional jet fuel., Fuel-efficient aircraft: airlines investing in newer, more fuel-efficient aircraft that consume less fuel and produce fewer emissions per passenger., Eco-friendly in-flight services: airlines reducing single-use plastics, offering locally sourced food, and minimizing waste during flights., Noise reduction technologies: adoption of technologies and flight procedures that minimize noise pollution, which can be a component of broader environmental sustainability efforts.	Male	30-39	Cameroon	Master's degree	Employed	2.000-2.999 €

Appendix F: Supplemental Graphs 2

Supplemental Power BI Graphs Empirical Article

Appendix Graphic 9: Annual Air Travel Frequency Among Respondents



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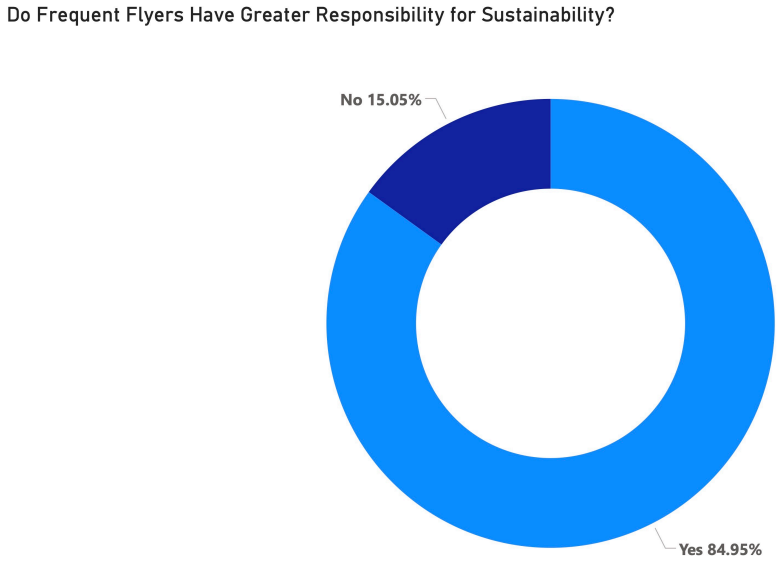
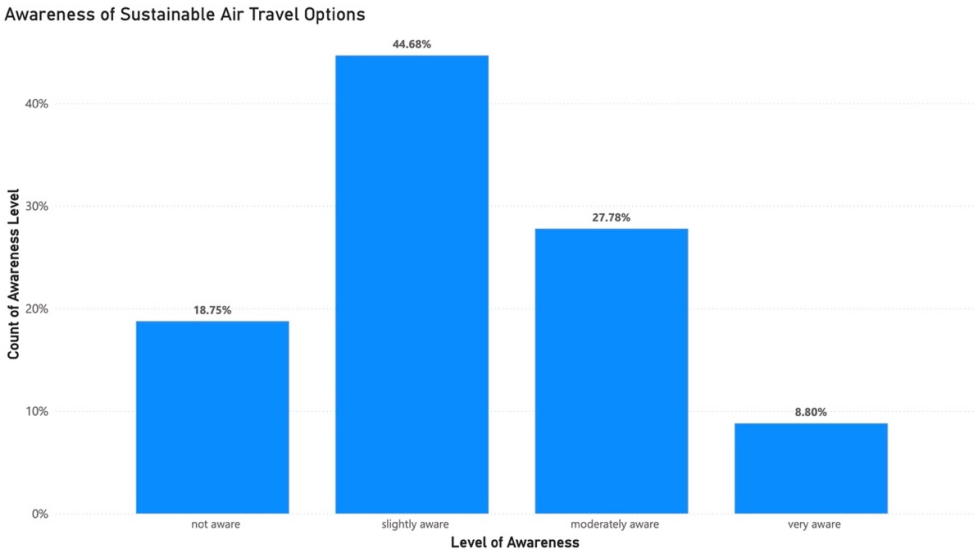
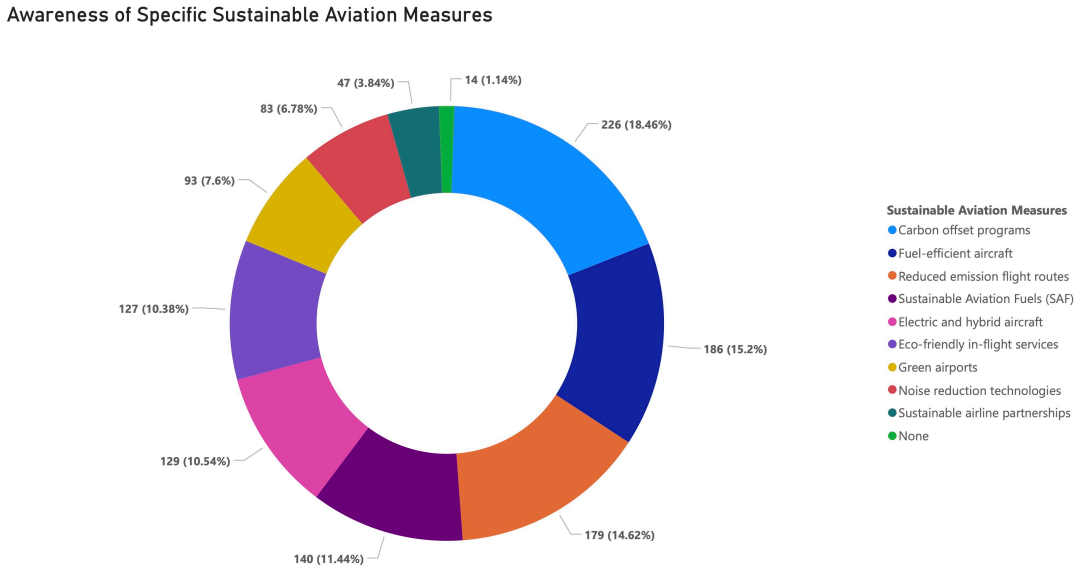
Appendix Graphic 10: Responsibility of Frequent Flyers



Appendix Graphic 11: Awareness of Sustainable Air Travel Options



Appendix Graphic 12: Awareness of Specific Sustainable Aviation Measures



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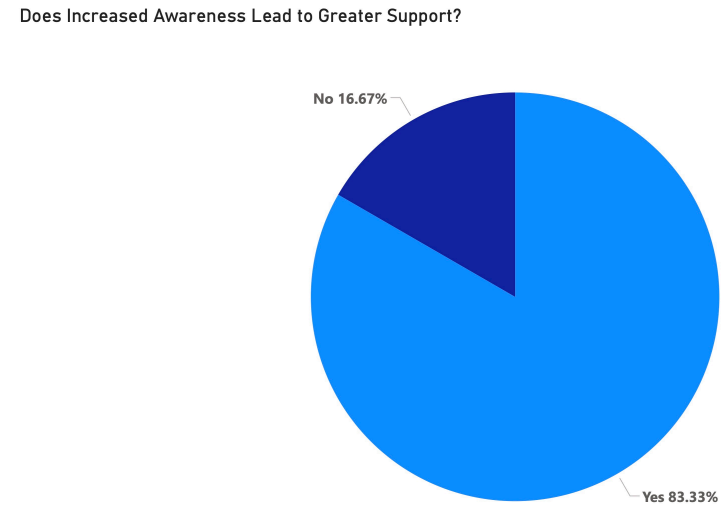
Appendix Graphic 13: Greater Support Through Increased Awareness



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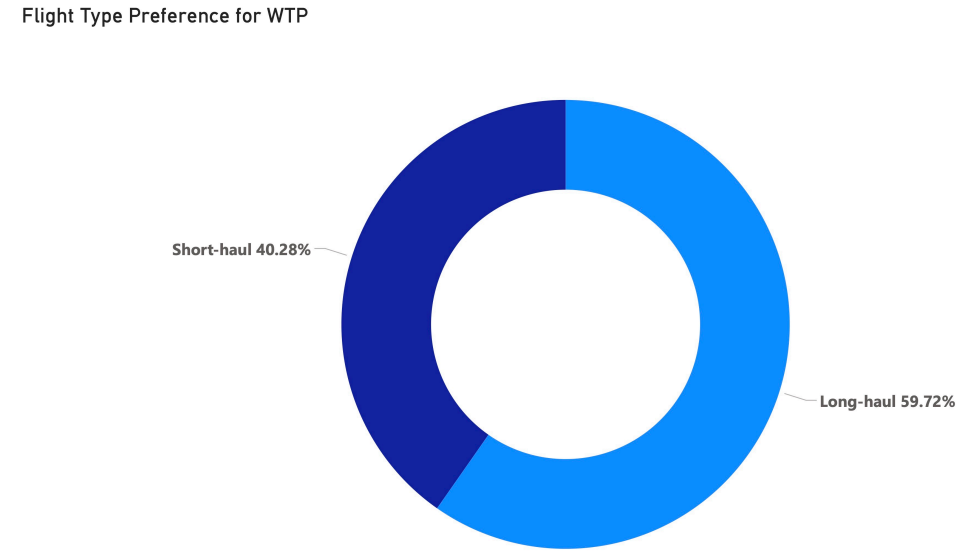
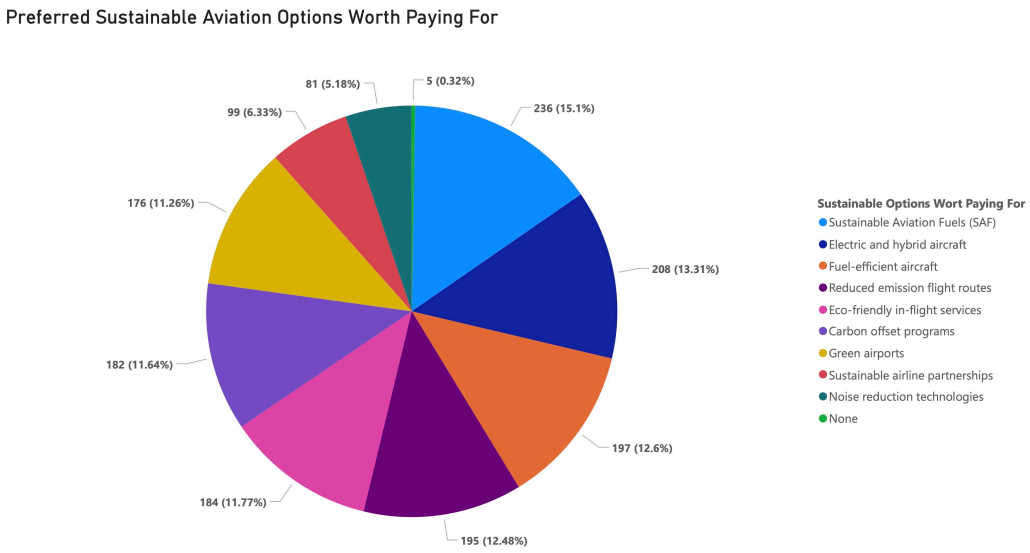
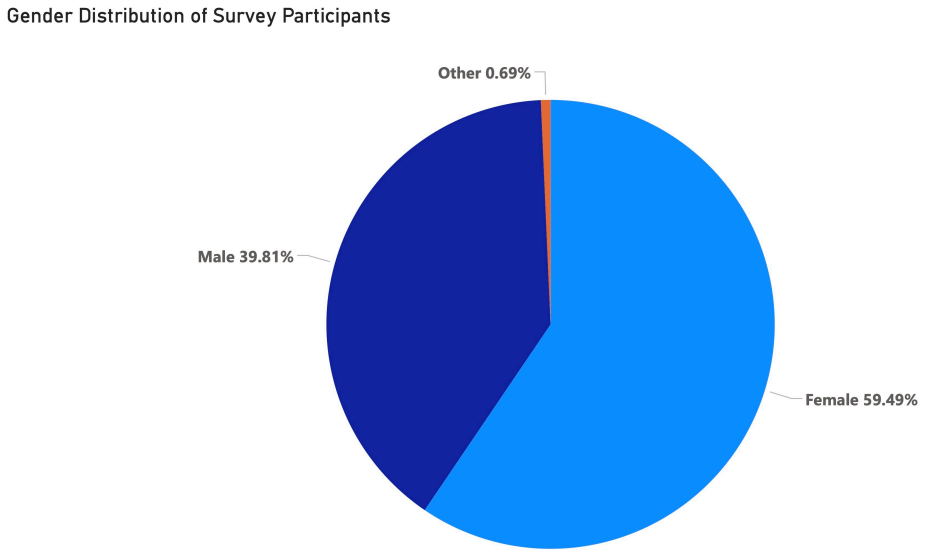
Appendix Graphic 14: Flight Type Preference



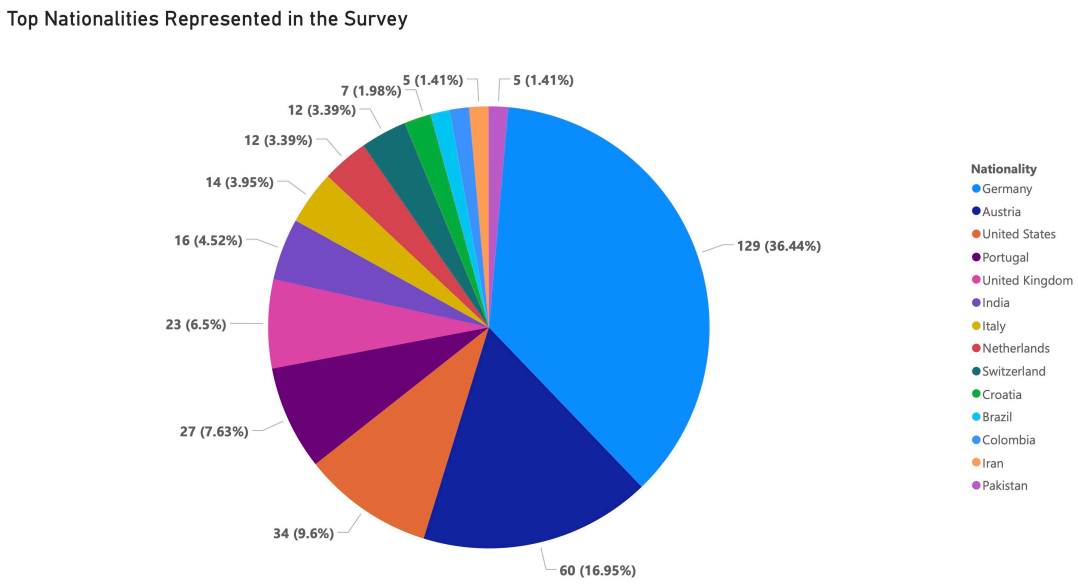
Appendix Graphic 15: Preferred Sustainable Aviation Options



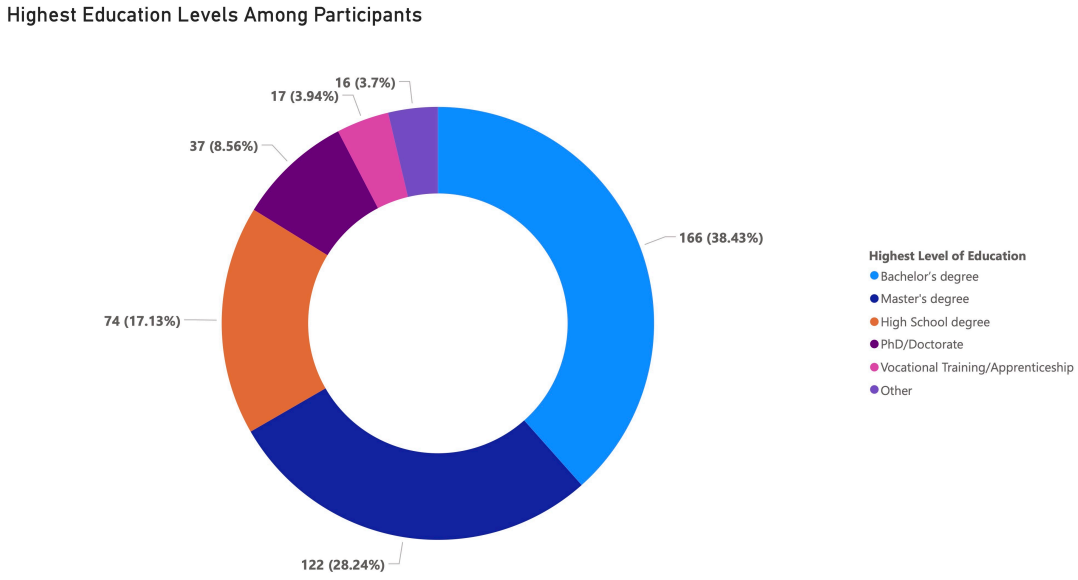
Appendix Graphic 16: Gender Distribution



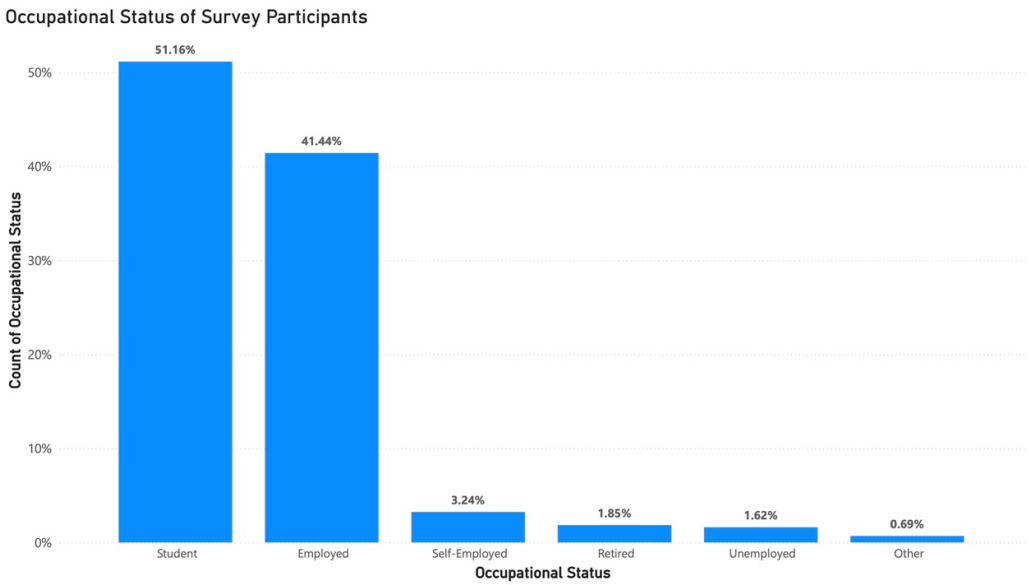
Appendix Graphic 17: Top Nationalities Represented in the Survey



Appendix Graphic 18: Education Levels Among Participants



Appendix Graphic 19: Occupational Status of Survey Participants



Appendix Graphic 20: Gross Monthly Income Distribution