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How Sociodemographic Attributes Influence Air Travel Frequency and Frequent Flyer Program Perceptions: Evidence from a Cross-Sectional Study

Alex Kipkorir Koech[1,*], Eric Tchouamou Njoya[2]

1. University of Antwerp – Antwerp Management School – Centre for Maritime and Air Transport Management – Antwerp – Belgium.
2. University of Huddersfield – Huddersfield Business School – Department of Logistics, Marketing, Hospitality and Analytics – Huddersfield – United Kingdom.

*Correspondence author: Koecha8@gmail.com

ABSTRACT

In an increasingly competitive air transport market, understanding customer demographics is crucial for airlines to develop targeted marketing strategies. This study investigates how sociodemographic factors influence the frequency of air travel and Frequent Flyer Program (FFP) adoption. Data from 427 online surveys of travelers aged 18 and above revealed that gender had no significant impact on either travel frequency or FFP adoption ($p = 0.796$). However, attributes such as age, marital status, ethnic/racial origin, education, and income significantly influenced these behaviors. While education ($p = 0.165$) and occupation ($p = 0.061$) showed no direct impact on FFP adoption, they were significant for travel frequency. Interestingly, lower-income groups exhibited a strong inclination toward FFP enrollment despite their lower flying frequency, indicating a tendency for segments with fewer benefits from FFPs to adopt them more readily. These findings suggest that airlines can enhance loyalty and market penetration by tailoring strategies to specific demographic segments, optimizing offerings for diverse traveler needs. The study highlights opportunities for future research into customer behavior and its implications for competitive advantage in the aviation industry.

Keywords: Air travel frequency; Frequent Flyer Programs; Customer relationship management; Sociodemographic attributes; Customer segmentation.

INTRODUCTION

In recent years, the air transport industry has experienced significant growth due to market deregulations, technological advancements, and increased purchasing power in developing economies. These factors have led to lower costs and greater affordability of air travel, transforming it from a luxury to a driver of economic growth, as noted by the Air Transport Action Group (ATAG 2011). Despite the challenges posed by the COVID-19 pandemic in 2020, the aviation industry has shown resilience, with global passenger numbers expected to rebound by 2024 (IATA 2022). Intense competition in the airline industry persists despite the post-COVID surge in travel demand, leading to financial challenges for many carriers. To thrive in this competitive landscape, airlines must strategically redefine their brands and adopt targeted marketing

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strategies to cater to diverse traveler demographics (Khan *et al*. 2019; Thakshak 2018). This includes implementing aggressive marketing campaigns and innovative strategies to attract and retain customers, ensuring their viability in the market (Shiwakoti *et al*. 2021).

Understanding consumer behavior and needs is, therefore, crucial for airlines to succeed in the market (Naletina *et al*. 2019). Airlines must focus on the "pull factor" that captures the interest and loyalty of potential travelers (Medina-Muñoz *et al*. 2020). Identifying key attributes that attract, satisfy, and retain passengers is essential for competitiveness and profitability (Oyewole 2008; 2020). Employing market segmentation strategies is vital as air travelers have diverse backgrounds and preferences influencing their choices (Avram 2019). Demographic variables play a significant role in consumer profiling and segmentation (Lewis 1981; Lucyna 2016), guiding airlines in targeting specific customer segments for loyalty and repeat purchases.

As airlines adapt to changing market dynamics, recent studies have highlighted a growing emphasis on enhancing the passenger experience through innovation. In the context of the significant growth and changes occurring in the air transport industry, initiatives such as those by Nascimento *et al*. (2024) and Silva *et al*. (2023) indicate a pivotal shift toward improving customer well-being. Smart cabin modernization and improved accommodation for older passengers and those with disabilities have become key focus areas in enhancing inclusivity and comfort. Complementing these efforts, the works of Sadou and Njoya (2023) and Sampaio *et al*. (2022) have contributed valuable insights into the role of complex network models and artificial intelligence (AI) applications in optimizing air traffic management and overall passenger experience. These developments underscore the industry's commitment to leveraging technology and passenger-centric innovations to create a more seamless and accessible air travel experience.

Therefore, customer relationship management (CRM) is crucial in the airline industry due to globalization, intense competition, and technological advancements (Liou 2009). Shaw (2016) defines CRM as a marketing philosophy that prioritizes maintaining and strengthening relationships with existing customers while seeking new ones. Airlines adopt customer-centric strategies to foster associations, increase repeat purchases, and create value (Alshurideh *et al*. 2019). This approach helps identify and retain loyal customers, leading to additional profits with fewer marketing costs (Law 2017). Effective airline CRM relies heavily on frequent flyer loyalty programs, which encourage repeat purchases and reduce communication efforts (Sara *et al*. 2011). These programs offer financial stability during prosperous times and a captive audience for stimulating travel interest during uncertainties (Pascual and Cain 2022). Understanding factors influencing passenger choice and loyalty, including sociodemographic characteristics like gender, age, education, and income, is crucial (Wever 2017). However, while several studies have examined FFP effectiveness, customer satisfaction, and service quality, there remains a significant gap in understanding the sociodemographic factors that influence FFP adoption and air travel frequency.

Although sociodemographic factors such as gender, age, education, and income have been recognized as key determinants of consumer behavior in air travel (Wever 2022), research explicitly linking these factors to FFP adoption and travel frequency remains scarce. Previous studies have primarily focused on service quality, loyalty program structures, and airline branding, yet few have quantitatively examined how sociodemographic differences influence frequent flyer membership and travel patterns. To the best of our knowledge, this study represents one of the first quantitative investigations into how sociodemographic attributes shape FFP adoption and air travel frequency, thereby addressing a notable gap in existing literature.

Guided by relationship marketing theory (RMT) (Berry 1983), this study aims to explore the sociodemographic influences on air travel frequency and attitudes toward airline loyalty programs (FFP). Using cross-sectional data from 427 online respondents, this research seeks to identify key sociodemographic factors impacting travel frequency and FFP adoption. The research questions address:

- How do sociodemographic factors like gender, age, marital status, education, occupation, and income relate to travel frequency and FFP adoption among air travelers?
- Are there significant differences or associations between sociodemographic profiles of air travelers regarding travel frequency and FFP adoption?

THEORETICAL BACKGROUND AND LITERATURE REVIEW

Customer relationship management and marketing theory

The buying behavior of airline travelers is rapidly evolving in today's technology-driven environment. Factors such as technological advancements, increased product options, globalization, individualization, and customer education have reshaped relationships between firms and stakeholders (Amoako *et al.* 2019; Boateng 2019). Consequently, managing customer relationships through CRM has become crucial. Scholars like Yim *et al.* (2013) have highlighted three key concepts – customer orientation, relationship marketing, and database marketing – that have shaped CRM. Airlines, facing challenges in mass advertising, now see CRM as essential for targeting specific customer segments effectively.

CRM has diverse interpretations in the literature, ranging from narrow to broad perspectives. At its core, CRM stems from RMT by Berry (1983), focusing on attracting, developing, and retaining customer relationships. Gummesson (1994) sees CRM as centered around relationships, networks, and interactions, while Gronroos (1996) emphasizes its role in maintaining mutually beneficial relationships. These traditional views of CRM were more aligned with mass marketing but have evolved to address individual customer needs (Rahim 2018). Newer conceptualizations, like Zikmund *et al.* (2003), define CRM as a business strategy using technology to provide a comprehensive view of the customer base, supporting relationship maintenance and expansion.

CRM involves a cycle aimed at customer retention, including steps such as collecting and storing data, profiling consumer segments, maintaining relationships, adjusting products, and fostering trust and loyalty (Salah and Abou-Shouk 2019). The literature outlines various dimensions of CRM. Yim *et al.* (2013) identify focusing on key customers, organizing around CRM, managing knowledge, and incorporating CRM-based technology. Hashem (2012) mentions commitment, trust, bonding, and communication, while Khan (2013) adds dimensions such as emotions, tangibility, empathy, reciprocity, and conflict handling. These dimensions collectively contribute to customer retention, enhancing satisfaction and loyalty through effective CRM practices in airlines.

Frequent Flyer Program (FFP) as a CRM tool

Understanding travelers' needs is vital for airlines to establish lasting relationships. Loyalty programs in airlines follow a similar cycle to CRM, offering benefits such as earning points for free tickets (Law 2017; Lee-Anant 2022). The FFPs let passengers accumulate and redeem rewards based on miles flown, encouraging repeat business (Sandada and Matibiri 2016). Frequent Flyer Programs (FFP) are a key CRM tool, ensuring customer loyalty and a competitive edge. They use personalized marketing and rewards to attract and retain customers, fostering emotional bonds that lead to continued engagement and loyalty (Lee-Anant 2022). Frequent Flyer Programs (FFP) are a crucial tool for airline CRM, impacting relationship marketing success and airline profitability (Kalantzis 2017). They provide valuable customer data for marketing efforts, business planning, and personalized services (Lee-Anant 2022). Frequent Flyer Programs (FFP) help airlines understand customer spending behavior, aiming to convert regular customers into loyal patrons (Koech *et al.* 2023). Additionally, FFPs facilitate airline partnerships, expanding market reach (Briliana 2018). Originating in the late 1970s, FFPs were pioneered by Texas International Airlines, which rewarded passengers based on mileage tracking. This was followed by Western Airlines, which established the "travel bank" concept, eventually merging with Delta Airlines and becoming part of the SkyMiles program created in 1981. Other major airlines such as American Airlines and United Airlines also launched their FFPs in the same year (Kalantzis 2017; Lee-Anant 2022).

Hypothesis development

Customer social demographic segmentation and FFPs

Airlines now have extensive access to precise traveler data, a crucial aspect emphasized by Lee-Anant (2022). Utilizing FFPs as a CRM tool allows airlines to analyze traveler purchasing behavior effectively. In today's competitive airline industry, systematically categorizing customers not only boosts loyalty but also expands the airline's profitable customer base, fostering long-term relationships (Khalili-Damghani *et al.* 2018). With customers increasingly aware of their rights and preferences, airlines risk losing them to competitors if their needs are not met adequately (Gupta 2018). Thus, airlines must adapt to evolving market dynamics by understanding their customers better, a task achieved through effective customer segmentation.

According to Kotler and Keller (2016), successful marketing teams prioritize segments with the highest satisfaction potential, building on Smith's (1956) concept that tailoring products and services to specific market segments yields better results than

targeting mass markets. Airlines must adopt customer-oriented segmentation strategies to group passengers with similar needs and respond to targeted marketing efforts effectively. Traditional segmentation based solely on trip purposes, such as business or leisure travel, is inadequate in understanding passengers' experiences (Avram 2019; Harrison *et al*. 2015). Passengers now consider overall travel experiences and loyalty, alongside price when choosing airlines. Successful segmentation thus depends on choosing relevant measures for partitioning passengers (Rahim 2018). Airlines can employ methods such as geographic, demographic, or psychographic segmentation, aligning with consumer needs and responses (Kotler and Keller 2002).

Despite extensive research on consumer buying behavior, scholarly literature specifically exploring how airline passengers' behavior relates to their sociodemographic characteristics is lacking. Sociodemographic factors have long been recognized as influential in purchase decisions (Lucyna 2016; Oyewole 2008; 2020). Previous studies often focused on specific attributes. For instance, Boonekamp *et al.* (2018) found that stronger ethnic ties between origin and destination markets increased air travel demand. Jiang and Zhang (2016) explored income and age in relation to service quality, noting higher-income passengers' satisfaction and older passengers' positive ratings. However, a comprehensive study on how various sociodemographic factors collectively affect airline choice behavior is lacking. Attributes such as gender, education, marital status, and occupation, and their influence on airline choice and participation in FFPs, remain understudied. This study aims to bridge this gap by examining how different sociodemographic factors impact travel frequency and FFP participation.

• Gender association and influence on travel frequency and FFP adoption – Gender, a contentious concept, is viewed through Butler's (1990) lens in this study, seen as a binary classification based on sex: male and female. It is a cultural interpretation of sex, shaping roles and responsibilities in societies. Biological differences may lead to distinct behaviors in information search and decision-making. Research by Furaji *et al.* (2013) indicates that women conduct more detailed information searches before purchases, while Imam (2013) suggests women are more emotionally attached and responsive to marketing. This study hypothesizes that gender may influence aspects of airline travelers' behavior, including information search, purchase decisions, and emotional responses to marketing efforts.

Hypothesis 1:

H1a) Gender does not portray a significant difference in flight frequency.

H1b) Gender does not portray a significant difference in the likelihood of adopting airline FFPs.

• Age group association and influence on travel frequency and FFPs adoption – Different passenger groups approach air travel uniquely, with age standing out as a key influencer of consumer behavior, including airline choice and loyalty. Research indicates that older individuals tend to travel more frequently as they gain experience (Nieves *et al.* 2016). Millennials, however, often prioritize discounts over loyalty programs and are less likely to collect frequent flyer miles (Grous 2019). Understanding these generational differences is crucial for airlines to tailor their services effectively. Generation Z, representing a significant portion of the adult population, is particularly influential. This study hypothesis posits that age-related generational differences significantly impact travel behavior and airline preferences.

Hypothesis 2:

H2a) Age groups do not significantly differ in flight frequency.

H2b) Age groups do not significantly differ in airline FFP adoption.

• Marital status association and influence on travel frequency and FFPs adoption – The marital status of individuals plays a crucial role in shaping consumer behavior and preferences. Different marital status categories, such as single, married, divorced, or widowed, represent diverse segments of society with distinct preferences. Research suggests that marital status significantly influences consumer responses to brand attributes (Rahim 2018). Additionally, studies have shown that marital status affects airline choice, highlighting its importance in shaping individuals' preferences (Ukpere *et al.* 2012). This intricate relationship underscores the need for thorough analyses that consider various dimensions of passenger attributes.

Hypothesis 3:

H3a) Marital status does not significantly differ in flight frequency.

H3b) Marital status does not significantly differ in airline FFP membership adoption.

• Ethnic/racial origin association and influence on travel frequency and FFPs adoption – The role of racial demographics in understanding consumer behavior within various target groups is complex and intertwined with geo-demographics, which analyze individuals based on their residential locations (Leung *et al.* 2017; Sleight 2004). Research by Boonekamp *et al.* (2018) has highlighted the impact of ethnic ties between origin and destination on air travel demand, emphasizing the nuanced relationship between

racial origins and travel preferences. However, scholarly literature on this subject is limited due to commercial confidentiality constraints (Leung *et al.* 2017). Despite these challenges, the study proposes the following hypothesis:

Hypothesis 4:

H4a) Ethnic/racial origin does not significantly differ in flight frequency.

H4b) Ethnic/racial origin does not significantly differ in airline FFP membership adoption.

• Education level association and influence on travel frequency and FFPs adoption – The impact of educational attainment on consumer behavior, particularly in air travel, has been widely studied, revealing its interconnectedness with income and occupation (Rahim 2018). Individuals with higher educational qualifications tend not only to command higher earning potential but also display an increased proclivity toward air travel. While research findings on this topic vary, it is clear that education level plays a crucial role in shaping travel behavior and participation in airline FFPs. Therefore, the study proposes the following hypothesis:

Hypothesis 5:

H5a) Educational level does not significantly differ in flight frequency.

H5b) Educational level does not significantly differ in airline FFP membership adoption.

• Occupation background association and influence on travel frequency and FFPs adoption – Occupational backgrounds, ranging from part-time to full-time roles in various sectors, significantly influence travelers' frequency of travel, flight preferences, and loyalty (Nieves *et al.* 2016; Rahim 2018). Active workers often exhibit higher travel rates due to greater purchasing power. Recognizing these differences allows airlines to tailor marketing and loyalty programs, fostering long-term loyalty among different professional segments.

Hypothesis 6:

H6a) Occupational background does not significantly differ in flight frequency.

H6b) Occupational background does not significantly differ in airline FFP membership adoption.

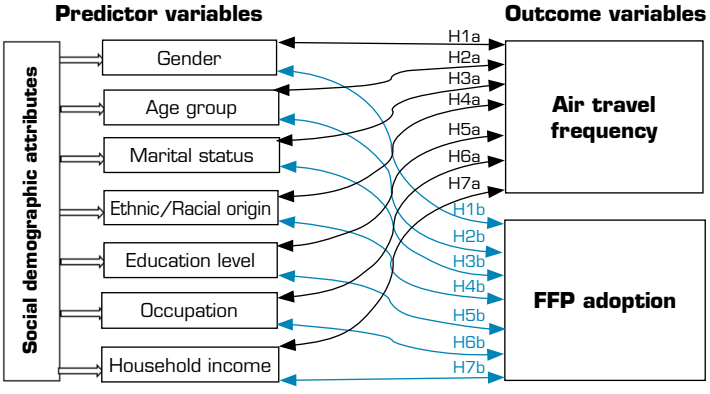
• Income association and influence on travel frequency and FFPs adoption – Income is a significant factor influencing consumer behavior, especially in air travel. Higher incomes often translate to more frequent travel, as individuals with greater financial flexibility can allocate resources to leisure or business (Dorota 2013; Vivek 2010). Conversely, lower-income individuals may perceive air travel as a luxury and travel less frequently. In terms of FFP adoption, higher-income individuals may find the associated financial commitment manageable, given the potential rewards like priority boarding and lounge access.

Hypothesis 7:

H7a) Household income does not significantly differ in flight frequency or airline FFP adoption.

H7b) Household income does not significantly differ in airline FFP membership adoption.

The conceptual framework (Fig. 1) illustrates the hypothesized relationships between selected socio-demographic attributes (predictor variables) and the two key outcome variables: air travel frequency and frequent flyer program (FFP) adoption. The framework posits that variables such as gender, age group, marital status, ethnic/racial origin, education level, occupation, and household income influence both the frequency of air travel (H1a–H7a) and the likelihood of FFP adoption (H1b–H7b).



Source: Elaborated by the authors.

Figure 1. Conceptual framework.

METHODOLOGY

Research design, target population, data type, and collection

The primary objective of this study is to examine the relationship between sociodemographic factors, air travel frequency, and FFP adoption among airline passengers. Employing a quantitative research design with a descriptive analytical approach, the study targeted general airline passengers aged 18 and above, without restrictions based on travel purpose or airline business models. Data collection took place from April to May 2021, during the COVID-19 pandemic in Belgium, using an online Qualtrics survey. The survey was distributed across aviation professional pages and travel groups on LinkedIn and Facebook, ensuring participation from frequent travelers across diverse geographic regions. A total of 498 responses were received, of which 427 valid responses were analyzed after removing incomplete or invalid data. The sample comprised 247 males (57.8%) and 180 females (42.2%), with the majority belonging to Gen Z (18-24 years) and Gen Y.2 (30-40 years). Additionally, 285 respondents (66.7%) identified as single or unmarried. Regarding ethnicity and regional representation, 210 respondents (49.2%) were from the European Union (EU) and the United Kingdom (UK), followed by 133 (31.1%) from Africa, with smaller representations from Australia and Latin America. In terms of education, over 70% held a bachelor's degree or higher, while income distribution showed that the largest proportion (33.7%) reported an annual household income of ≤ $15,000 (Tables 1 and 2).

Table 1. Respondents' demographic characteristics.

Respondents demographic characteristics							
Gender		Male	Female	Prefer not to state			Total
Frequency		247	180	Omitted			427
Percentage		57.8	42.2	(one respondent did not meet the minimum 20 entries)			100.0
Age (years)	Gen Z (18-24)	Gen Y.1 (25-29)	Gen Y.2 (30-40)	Gen X (41-56)		Baby Boomers (+57)	Total
Frequency	129	98	105	62		33	427
Percentage	30.2	23.0	24.6	14.5		7.7	100.0
Marital status	Single	Married	Separated	Divorced		Widow/widowed	Total
Frequency	285	128	4	6		4	427
Percentage	66.7	30.0	0.9	1.4		0.9	100.0
Ethnicity/origin	African	North American	Australian	Asian	EU/UK	Latino	Total
Frequency	133	12	7	60	210	5	427
Percentage	31.1	2.8	1.6	14.1	49.2	1.2	100.0
Education level	High school diploma	College degree/ diploma	Bachelor's degree	Master's degree	Professional degree	Doctorate	Total
Frequency	43	25	143	167	19	30	427
Percentage	10.1	5.9	33.5	39.1	4.4	7.0	100.0
Annual income	< $14,999	$15,000-$25,999	$26,000-$40,999	$41,000-$50,999	$51,000-$99,999	> $100,000	Total
Frequency	144	71	72	45	47	48	427
Percentage	33.7	16.6	16.9	10.5	11.0	11.2	100.0

Source: Elaborated by the authors.

The study delved into the occupational backgrounds of respondents, their annual frequency of air travel, and their membership status in airline FFPs. Analysis (refer to Table 2) showed that the largest occupational group was Management & Administration, comprising 98 respondents (23%), followed by Academics, Training & Research with 66 respondents (15.5%). A single respondent (0.2%) identified their occupation as Farming, Fishing, or Forestry (Agri-Business).

Regarding annual flight frequency, the majority flew four or more times per year (131 respondents or 30.7%), followed by 108 respondents (25.3%) who flew twice annually, and 100 (23.4%) who flew either once or not at all during the year. Furthermore, a majority of respondents (218 or 51.1%) reported being members of an airline FFP. Given the almost equal split in FFP adoption, the contingency tables below offer a more detailed view of the associations.

Table 2. Respondents' occupation, frequency of flying, and FFP membership.

	Frequency	Percentage
Occupation		
Management and Administration	98	23.0
Accountancy and Finance	34	8.0
Architecture and Engineering	23	5.4
Legal/Law	32	7.5
Academics, Training, Research & Library	66	15.5
Arts/Design/Entertainment/Sports/Media	11	2.6
Healthcare/Medical	41	9.6
Farming, Fishing & Forestry (Agri-Business)	1	0.2
Transport/Logistics/Supply Chains	55	12.9
Sales/Promotion and related	13	3.0
Hospitality/Tours/Travel	14	3.3
Military/Police/Security	5	1.2
Student	34	8.0
Total	427	100.0
Frequency of flying annually before COVID-19		
Once or less	100	23.4
Twice	108	25.3
Three times	88	20.6
Four times or more	131	30.7
Total	427	100.0
Airline FFP membership		
Yes	218	51.1
No	209	48.9
Total	427	100.0

Source: Elaborated by the authors.

Type of variables and statistical data analysis

The predictor variables considered in this study encompass respondents' demographic attributes: gender, age group, marital status, ethnic/racial origin, education level, occupation, and annual household income. The survey included three gender categories (male, female, and prefer not to state), but the "prefer not to state" category was excluded from analysis as only one respondent ticked this option (the cells need a minimum of 20 entries). Five generational cohorts (age-groups) were retained as follows: Gen Z (18-24 years), Gen Y.1 (25-29 years), Gen Y.2 (30-40 years), Gen X (41-56 years), and Baby Boomers (+56 years). Regarding marital status, the survey originally had five categories, but due to low responses in the "separated," "divorced," and "widowed" categories, they were combined as follows: "separated" and "divorced" with "single/unmarried," and "widowed" with "married." Therefore, the study analyzed two groups of marital status: Single/Unmarried and Married.

The survey initially had six categories for ethnic/racial origin, which were consolidated into four categories: African, American (including respondents from Latin America and Australia), Asian, and EU/UK. Similarly, 13 occupational backgrounds were reclassified into nine groups for analysis: Management & Administration, Accountancy & Financial Operations, Architecture, Arts & Engineering, Legal/Law, Academics, Training & Research, Healthcare/Medical, Transport & Logistics, and Hospitality/Tours/Travel/Sales & Security.

The reason for merging some sociodemographic categories was to ensure each cell had a minimum of 20 entries, as recommended for statistical reliability (Oyewole 2020). This study analyzed two outcome variables: frequency of flying in a year and the likelihood

of FFP membership adoption, with respect to the respondents' demographic characteristics. The analysis employed descriptive statistics and analysis of variance (ANOVA), including;

- Contingency tables with Pearson's chi-square and Cramer's V coefficients.
- Multivariate ANOVA (MANOVA) with subsequent univariate ANOVA (one-way ANOVA) test and Tukey's honestly significant difference (HSD) test.

These analytical models provided a robust examination of the associations and potential significant differences among the sociodemographic attributes concerning air travel frequency and FFP membership adoption.

RESULTS

Common method bias and sample selection

This study acknowledges the potential for common method bias due to self-reported data collection via an online survey. To mitigate this, the questionnaire was structured to minimize leading questions, ensure clarity, and reduce respondent fatigue. Additionally, responses were anonymous, encouraging participants to provide candid and unbiased input. Regarding sample selection, a non-probability convenience sampling approach was employed, targeting frequent air travelers through aviation professional networks and travel-focused groups on LinkedIn and Facebook. This strategy was chosen to capture insights from individuals with firsthand airline travel experience across diverse geographic regions. However, this approach may have introduced self-selection and platform-access bias, as participation was voluntary and limited to users of these online platforms. To assess selection bias, the demographic distribution of the sample was examined against global air passenger trends, ensuring representation across age groups, income levels, and geographic regions. While the sample provides valuable insights, future research should enhance generalizability by adopting probability sampling techniques and broadening recruitment channels beyond online professional networks.

Hypothesis testing using contingency tables

The study focused on investigating how the demographic characteristics of respondents relate to their annual flight frequency and FFP adoption. Initial analysis utilized cross-tabulation, employing Pearson's chi-square test of independence to assess the relationship between variables. Furthermore, Cramer's V coefficient was assessed to gauge the strength of these associations, with values near zero indicating no association and values around 0.20 signifying a moderate to strong association, as recommended by Akoglu (2018).

Sociodemographic attributes and the frequency of flying

The chi-square test of independence revealed statistically significant associations between various sociodemographic attributes and the frequency of flying. For gender, there was a statistically significant association (chi-square [χ^2] = 8.094, degrees of freedom [df] = 3, p = 0.044, Cramer's V = 0.138), indicating a weak but meaningful relationship, suggesting that there is no substantial difference between the genders in the frequency of air travel. Similarly, age group showed a significant association (χ^2 = 37.240, df = 12, p = 0.000, Cramer's V = 0.295), with a moderate level of interdependence. Marital status also exhibited a significant relationship (χ^2 = 13.650, df = 3, p = 0.003, Cramer's V = 0.179), indicating a moderate influence on travel frequency. Ethnic/racial origin (χ^2 = 45.941, df = 9, p = 0.000, Cramer's V = 0.328), education level (χ^2 = 46.999, df = 15, p = 0.000, Cramer's V = 0.332), occupation (χ^2 = 45.953, df = 24, p = 0.004, Cramer's V = 0.327), and annual household income (χ^2 = 74.457, df = 15, p = 0.000, Cramer's V = 0.241) also showed statistically significant results with moderate associations. These findings suggest that while these sociodemographic factors are related to travel frequency, other variables may also contribute to the observed differences (Tables 3 and 4).

Sociodemographic attributes and relationships with FFP adoption

The analysis of sociodemographic variables revealed significant associations with the adoption of airline FFP, with moderate strengths of association observed. Age groups (χ^2 = 36.014, df = 4, p = 0.000, Cramer's V = 0.290), marital status (χ^2 = 16.973,

Table 3. Sociodemographic attributes relationship with frequency of flying annually and FFP adoption.

	Frequency of flight in a year						FFP membership			
	Once or less	Twice	Three times	Four times or more	Total	Chi-square	Yes	No	Total	Chi-square
Gender										
Male % within males	63 25.5	55 22.3	44 17.8	85 34.4	247 100.0		129 52.2	118 47.8	247 100.0	
Female % within females	37 20.6	53 29.4	44 24.4	46 25.6	180 100.0	8.094*	89 49.4	91 50.6	180 100.0	0.323
Total for gender % within gender	100 23.4	108 25.3	88 20.6	131 30.7	427 100.0		218 51.1	209 48.9	427 100.0	
Age groups (years)										
Gen Z (18-24) % within Gen Z	37 28.7	47 36.4	17 13.2	28 21.7	129 100.0		48 37.2	81 62.8	129 100.0	
Gen Y1 (25-29) % within Gen Y1	21 21.4	23 23.5	24 24.5	30 30.6	98 100.0		50 51.0	48 49.0	98 100.0	
Gen Y2 (30-40) % within Gen Y2	27 25.7	26 24.8	24 22.9	28 26.7	105 100.0		48 45.7	57 54.3	105 100.0	
Gen X (41 -56) % within Gen X	10 16.1	9 14.5	17 27.4	26 41.9	62 100.0	37.240***	44 71.0	18 29.0	62 100.0	36.014***
Baby Boomers (+ 57) % within Baby Boomers	5 15.2	3 9.1	6 18.2	19 57.6	33 100.0		28 84.8	5 15.2	33 100.0	
Total for age groups % within age groups	100.0 23.4	108 25.3	88 20.6	131 30.7	427 100.0		218 51.1	209 48.9	427 100.0	
Marital status										
Single/unmarried % within single/unmarried	74 25.1	85 28.8	49 16.6	87 24.5	295 100.0		131 44.4	164 55.6	295 100.0	
Married % within married	26 19.7	23 17.4	39 29.5	44 33.3	132 100.0	13.650**	87 65.9	45 34.1	132 100.0	16.973***
Total for marital status % within marital status	100 23.4	108 25.3	88 20.6	131 30.7	427 100.0		218 51.1	209 48.9	427 100.0	
Ethnic/racial origin										
African % within Africa	50 37.6	32 24.1	30 22.6	21 15.9	133 100.0		47 35.3	86 64.7	133 100.0	
American % within American	1 4.2	4 16.7	10 41.7	9 37.5	24 100.0		18 75.0	6 25.0	24 100.0	
Asian % within Asian	18 30.0	14 23.3	8 13.3	20 33.3	60 100.0	45.941***	36 60.0	24 40.0	60 100.0	22.399***
EU/UK % within EU/UK	31 14.8	58 27.6	40 19.0	81 38.6	210 100.0		117 55.7	93 44.3	210 100.0	
Total for ethnic origin % within ethnic origin	100 23.4	108 25.3	88 20.6	131 30.7	427 100.0		218 51.1	209 48.9	427 100.0	
Education level										
High school diploma % within high school	18 41.9	13 30.2	6 14.0	6 14.0	43 100.0		17 39.5	26 60.5	43 100.0	
College degree/diploma % within college degree/diploma	11 44.0	5 20.0	3 12.0	6 24.0	25 100.0		12 48.0	13 52.0	25 100.0	
Bachelor's degree % within bachelors	32 22.4	49 34.3	27 18.9	35 24.5	143 100.0		69 48.3	74 51.7	143 100.0	
Master's degree % within masters	29 17.4	36 21.6	45 26.9	57 34.1	167 100.0	46.999***	88 52.7	79 47.3	167 100.0	7.861
Professional degree % within professional degree	4 21.1	2 10.5	2 10.5	11 57.9	19 100.0		14 73.7	5 26.3	19 100.0	
Doctorate % within doctorate	6 20.0	3 10.0	5 16.7	16 53.3	30 100.0		18 60.0	12 40.0	30 100.0	
Total for education % within education level	100 23.4	108 25.3	88 20.6	131 30.7	427 100.0		218 51.1	209 48.9	427 100.0	

Source: Elaborated by the authors. *p < 0.05, **p < 0.01, ***p < 0.001.

Table 4. Demographic attributes of occupation and annual household income relationship with frequency of flying annually and FFP adoption.

	Frequency of flight in a year						FFP membership			
	Once or less	Twice	Three times	Four times or more	Total	Chi-square	Yes	No	Total	Chi-square
Occupation level										
Management & Administration	22	16	23	38	99		58	41	99	
% within Management	22.2	16.2	23.2	38.4	100.0		58.6	41.4	100.0	
Accountancy & Financial Operations	9	11	6	8	34		14	20	34	
% within Accountancy	26.5	32.4	17.6	23.5	100.0		41.2	58.8	100.0	
Architecture, Arts & Engineering	8	14	6	6	34		20	14	34	
% within Architecture, Arts & Engineering	23.5	41.2	17.6	17.6	100.0		58.8	41.2	100.0	
Legal/Law	5	6	6	15	32		18	14	32	
% within Legal/Law	15.6	18.8	18.8	46.9	100.0		56.3	43.7	100.0	
Academics, Training & Research	31	30	14	25	100	45.731**	41	59	100	13.460*
% within Academics, Training & Research	31.0	30.0	14.0	25.0	100.0		41.0	59.0	100.0	
Healthcare/Medical	17	8	6	10	41		16	25	41	
% within Healthcare/Medical	41.5	19.5	14.6	24.4	100.0		39.0	61.0	100.0	
Transport/Logistics/Supply Chains	7	13	15	20	55		31	24	55	
% within Transport/Logistics	12.7	23.6	27.3	36.4	100.0		56.4	43.6	100.0	
Hospitality/Tours/Sales/Security	1	10	12	9	33		20	12	32	
% within Hospitality	3.0	30.3	36.4	27.3	100.0		62.5	37.5	100.0	
Total for occupation	100	108	88	131	427		218	209	427	
% within Occupation Level	23.4	25.3	20.6	30.7	100.0		51.1	48.9	100.0	
Annual household income										
Less than $14,999	53	37	27	27	144		47	97	144	
% within less than $14,999	36.8	25.7	18.8	18.8	100.0		32.6	67.4	100.0	
$15,000-$25,999	21	26	11	13	71		33	38	71	
% within $15,000-$25,999	29.6	36.6	15.5	18.3	100.0		46.5	53.5	100.0	
$26,000 - $40,999	14	21	20	17	72		42	30	72	
% within $26,000-$40,999	19.4	29.3	27.8	23.6	100.0		58.3	41.7	100.0	
$41,000 - $50,999	5	8	9	23	45	74.457***	26	19	45	42.395***
% within $41,000-$50,999	11.1	17.8	20.0	51.1	100.0		57.8	42.2	100.0	
$51,000 - $99,999	4	10	12	21	47		33	14	47	
% within $51,000-$99,999	8.5	21.3	25.5	44.7	100.0		70.2	29.8	100.0	
$100,000 +	3	6	9	30	48		37	11	48	
% within $100,000 +	6.3	12.5	18.8	62.5	100.0		77.1	22.9	100.0	
Total for household income	100	108	88	131	427		218	209	427	
% within Household Income	23.4	25.3	20.6	30.7	100.0		51.1	48.9	100.0	

Source: Elaborated by the authors. *p < 0.05, **p < 0.01, ***p < 0.001.

df = 1, p = 0.000, Cramer's V = -0.199), ethnic/racial origin (χ^2 = 22.399, df = 3, p = 0.000, Cramer's V = 0.229), occupation (χ^2 = 16.376, df = 8, p = 0.037, Cramer's V = 0.178), and household income (χ^2 = 42.395, df = 5, p = 0.000, Cramer's V = 0.315) all showed significant relationships with FFP adoption attitudes. Conversely, gender (χ^2 = 0.323, df = 1, p = 0.570, Cramer's V = 0.027) and education (χ^2 = 7.861, df = 5, p = 0.164, Cramer's V = 0.136) exhibited non-significant relationships with FFP adoption, indicating negligible impacts. These results suggest that age, marital status, ethnic/racial origin, occupation, and household income significantly influence individuals' attitudes towards FFP membership adoption, while gender and education do not play a significant role in this aspect (Tables 3 and 4).

Further analysis was conducted to delve deeper into the associations identified in the contingency tables. The goal was to explore how specific attributes within the sociodemographic variables might differently influence the two outcome variables: the frequency of air travel and the likelihood of adopting FFP. This detailed examination aimed to reveal nuanced insights into the factors shaping individuals' travel behavior and their choices regarding FFP membership adoption.

Hypothesis testing using MANOVA tests

The study employed a MANOVA test to analyze specific subgroups within the sociodemographic variables, aiming to uncover unique patterns or trends. This approach provided deeper insights into the motivations and preferences influencing individuals' decisions regarding *air travel frequency* and *FFP membership*. Following the MANOVA, the one-way ANOVA was conducted to further explore the results if they aligned with the formulated hypotheses. Detailed results from the MANOVA tests can be found in Tables 5 and 6.

Table 5. Multivariate ANOVA (MANOVA) and test between-subjects effects: results of the test of hypotheses H1-H7.

Hypothesis	Wilks λ	Approx. F	Hypotheses df	Error df	Sig. of F	η^2	Hypothesis (null)
H1 (Gender)	0.999	0.228	2.000	424.000	0.796	0.001	Accept
H2 (Age group)	0.893	6.158	8.000	842.000	0.000*	0.055	Reject
H3 (Marital status)	0.959	9.049	2.000	424.000	0.000*	0.041	Reject
H4 (Ethnic/racial origin)	0.901	7.529	6.000	844.000	0.000*	0.051	Reject
H5 (Educational level)	0.927	3.288	10.000	840.000	0.000*	0.037	Reject
H6 (Occupation)	0.926	2.324	14.000	836.000	0.004*	0.037	Reject
H7 (Household income)	0.808	9.468	10.000	840.000	0.000*	0.101	Reject

Source: Elaborated by the authors. Approx. F = the value of F that roughly equals the value of the given test. * Significant at the 0.05 level.

Table 6. Univariate ANOVA (one-way ANOVA): results of H2, H3, H4, H5, H6, and H7.

Hypothesis (IVs)		DVs	Approx. F	Hypotheses df	Error df	Sig. of F	η2	Hypothesis (null)
H2 (Age groups)	H2a	Frequency of flying	6.571	4	422	0.000*	0.059	Reject
	H2b	FFP membership adoption	9.718	4	422	0.000*	0.084	Reject
H3 (Marital status)	H3a	Frequency of flying	4.686	1	425	0.031*	0.011	Reject
	H3b	FFP membership adoption	17.485	1	425	0.000*	0.040	Reject
H4 (Ethnic/racial origin)	H4a	Frequency of flying	11.277	3	423	0.000*	0.074	Reject
	H4b	FFP membership adoption	7.806	3	423	0.000*	0.052	Reject
H5 (Educational level)	H5a	Frequency of flying	7.620	5	421	0.000*	0.067	Reject
	H5b	FFP membership adoption	.393	5	421	0.0165	0.018	Accept
H6 (Occupation)	H6a	Frequency of flying	3.649	7	419	0.001*	0.057	Reject
	H6b	FFP membership adoption	1.948	7	419	0.061	0.032	Accept
H7 (Household income)	H7a	Frequency of flying	16.880	5	421	0.000*	0.149	Reject
	H7b	FFP membership adoption	2.119	5	421	0.000*	0.099	Reject

Source: Elaborated by the authors. **Significant at the 0.005 level.

In Table 5, the MANOVA results display the outcomes for each independent variable (gender, age, marital status, ethnic/racial origin, education level, occupation, and household income) regarding the two dependent variables (frequency of flying and FFP adoption). While the majority of hypotheses showed significant values, Hypothesis H1 yielded non-significant values of Wilks' λ, resulting in non-significant F values at the 0.05 significance level. Specifically, the hypothesis examining gender differences produced the following statistics: Wilks' $\lambda = 0.999$; $F(2,424) = 0.228$; $p < 0.796$; eta squared (η^2) = 0.001. The partial η^2 of 0.001 indicates a very small effect size, implying that only 0.1% of the variance in the dependent variable is attributed to gender. This suggests that gender has minimal impact on both the frequency of flying and attitudes towards FFP membership adoption. Consequently, since the gender hypothesis did not demonstrate a statistically significant difference, it does not support the notion that gender significantly influences air travelers' frequency of flying in a year or their inclination to join airline FFPs.

On the other hand, six hypotheses (H2, H3, H4, H5, H6, and H7) exhibited significant values of Wilks' λ, resulting in significant F values at the 0.05 significance level. For instance, household income statistics show Wilks' $\lambda = 0.805$; $F(10,840) = 9.468$; $p < 0.000$;

$\eta^2 = 0.101$. The partial η^2 for household income indicates a substantial effect size, suggesting that household income accounts for 10.1% of the variance in both frequency of air travel and FFP adoption. As a result, these hypotheses are supported. Therefore, the data gathered in this study provide compelling evidence that sociodemographic variables such as age group (H2), marital status (H3), ethnic/racial origin (H4), educational level (H5), occupation (H6), and household income (H7) significantly influence the frequency of air travel in a year and the adoption of airline FFP membership within the airline industry.

Hypothesis testing using one-way ANOVA tests

After confirming the support for the main hypotheses H2, H3, H4, H5, H6, and H7, further follow-up analyses were conducted. Table 6 summarizes the one-way ANOVA, which identifies the dependent variables significantly contributing to differences in the mean vector. The p-values obtained from this analysis align with the earlier MANOVA results, indicating significant differences between sociodemographic attributes, except for H5b (education level, $p = 0.165$) and H6b (occupation, $p = 0.061$) concerning airline FFP membership adoption. These two variables showed no significant differences regarding the adoption of airline FFPs. Additional post-hoc tests were conducted using Tukey's HSD to explore significant differences among the groups, with a significance level set at $p < 0.05$.

Hypothesis (H2): age groups post-hoc test (Tukey's HSD) for frequency of flying and FFP adoption

The analysis revealed notable differences in the frequency of flying based on generational cohorts. Baby Boomers (mean [M] = 3.18, standard deviation [SD] = 1.131) reported a higher frequency of air travel compared to Gen Z (M = 2.28, SD = 1.104), Gen Y.1 (M = 2.64, SD = 1.133), Gen Y.2 (M = 2.50, SD = 1.145), and Gen X (M = 2.95, SD = 1.108). Tukey's HSD test indicated significant negative mean differences between Gen Z and Gen X (mean diff = = -0.67, p = 0.001), and between Gen Z and Baby Boomers (mean diff = = -0.90, p = 0.000). Gen Y.2 also showed a significant negative mean difference compared to Baby Boomers (mean diff = = -0.68, p = 0.022). These results suggest that younger generations travel less frequently than older generations, disproving hypothesis H2a.

Regarding FFP adoption, Gen Z (18-25 years; M = 1.63, SD = 0.485) showed significant differences compared to other age groups: Gen Y.1 (M = 1.49, SD = 0.502), Gen Y.2 (M = 1.54, SD = 0.501), Gen X (M = 1.29, SD = 0.458), and Baby Boomers (M = 1.15, SD = 0.364). Tukey's HSD indicated positive significant differences in FFP adoption between Gen Z and Gen X (mean diff = = 0.34, p = 0.000), and between Gen Z and Baby Boomers (mean diff = = 0.48, p = 0.000). Additionally, significant differences were found between Gen Y.1 and Baby Boomers (mean diff = = 0.34, p = 0.005), and between Gen Y.2 and Gen X (mean diff = = 0.25, p = 0.010), and Gen Y.2 and Baby Boomers (mean diff = = 0.25, p = 0.001). These findings indicate a greater appetite for FFP membership adoption among the younger generations, hence disproving hypothesis H2b.

Hypothesis (H3): marital status post-hoc test (Tukey's HSD) for frequency of flying and FFP adoption

Post-hoc tests were not performed for marital status because there are fewer than three groups. However, prior ANOVA results disproved both hypotheses H3a and H3b.

Hypothesis (H4): ethnic/racial origin post-hoc test (Tukey's HSD) for frequency of flying and FFP adoption

The analysis unveiled significant differences in the frequency of air travel based on participants' ethnic/racial backgrounds. Europeans (M = 2.81, SD = 1.106) reported notably higher-flying frequency than Africans (M = 2.17, SD = 1.102) and Asians (M = 2.50, SD = 1.242), but slightly lower than Americans (M = 3.13, SD = 0.850). Africans exhibited the least variance in air travel frequency. Specifically, the mean difference in travel frequency between Europeans and Africans (mean diff = 0.65, p = 0.000) was the only statistically significant value among racial/ethnic origin groups. Hence, the null hypothesis H4a is disapproved.

Regarding ethnic/racial origin and FFP membership adoption, Africans (M = 1.65, SD = 0.480) showed a significant difference from other racial groups: Americans (M = 1.25, SD = 0.442), Asians (M = 1.40, SD = 0.494), and UK/EU participants (M = 1.44, SD = 0.498). The comparison results revealed that Africans displayed a higher inclination towards adopting airline loyalty programs, followed closely by European travelers. The positive mean differences in loyalty program uptake for Africans were statistically

significant compared to other racial groups: Americans (mean diff = 0.40, p = 0.002), Asians (mean diff = 0.25, p = 0.007), and UK/EU participants (mean diff = 0.20, p = 0.001). Conversely, there were no significant mean differences in loyalty program adoption between European travelers and other racial origins. Therefore, hypothesis H4b is rejected.

Hypothesis (H5): education level post-hoc test (Tukey's HSD) for frequency of flying and FFP adoption

Individuals with lower educational qualifications, specifically a high school diploma (M = 2.00, SD = 1.069), reported a notably lower frequency of air travel compared to those with higher educational achievements, such as a college diploma (M = 2.16, SD = 1.248), Bachelor's degree (M = 2.45, SD = 1.092), Master's degree (M = 2.78, SD = 1.100), professional degree (M = 3.05, SD = 1.268), and Doctorate (M = 3.03, SD = 1.217). The statistical analysis highlighted significant mean differences between high school diploma holders and those with Master's degrees (mean diff = -0.78, p = 0.001), professional degrees (mean diff = -1.05, p = 0.009), and Doctorates (mean diff = -1.03, p = 0.002). These negative mean differences suggest that individuals with lower qualifications exhibit less inclination toward air travel compared to their counterparts with higher qualifications. However, there was no significant difference between respondents with lower and higher educational qualifications regarding the adoption of airline FFPs. This indicates that while educational level may impact the frequency of air travel, it does not significantly influence the likelihood of joining FFPs. Based on the results, the null hypothesis H5a is rejected, while hypothesis H5b fails to be rejected.

Hypothesis (H6): occupational backgrounds post-hoc test (Tukey's HSD) for frequency of flying and FFP adoption

Upon conducting a post-hoc analysis of occupational backgrounds, no significant differences were found between individuals' occupations and either the frequency of air travel or the adoption of airline FFPs. These results contradict the earlier MANOVA findings, which had initially indicated significant differences. As a result, it is concluded that the type of occupation an individual is involved in does not exert a significant effect on either the frequency of air travel or the likelihood of adopting airline FFPs. However, hypothesis H6b in relation to FFP membership adoption fails to be rejected in the ANOVA results.

Hypothesis (H7): household income post-hoc test (Tukey's HSD) for frequency of flying and FFP adoption

The post-hoc analysis of household income unveiled significant differences in the frequency of air travel between individuals with lower and higher household incomes. Those earning less than $14,999 flew significantly less often compared to those earning between $41,000-$49,999 (mean diff = -0.92, p = 0.000), less than $14,999 and between $50,000-$99,999 (mean diff = -0.87, p = 0.000), and less than $14,999 and above $100,000 (mean diff = -1.18, p = 0.000), indicating a clear correlation between income levels and travel frequency. Therefore, H7a is not supported.

Surprisingly, the analysis also revealed an interesting trend in airline FFP adoption based on household income. Lower-income individuals, particularly those earning less than $14,999, showed a significantly higher tendency to embrace FFP membership compared to higher-income groups: less than $14,999 and between $26,000-$40,999 (mean diff = 0.26, p = 0.003), less than $14,999 and between $41,000-$50,999 (mean diff = 0.25, p = 0.027), less than $14,999 and between $51,000-$99,999 (mean diff = 0.38, p = 0.000), and less than $14,999 and above $100,000 (mean diff = 0.44, p = 0.000). This suggests that while higher household incomes do not always correlate with a positive view of airline FFPs or a higher likelihood of membership, lower-income individuals tend to perceive FFPs more favorably and are more inclined to become members. Therefore, hypothesis H7b is rejected.

DISCUSSION

The study's findings highlight the varied associations between passenger sociodemographic profiles, their frequency of flying, and attitudes toward airline FFP membership. While gender did not manifest a significant effect on air travel frequency or FFP adoption, other sociodemographic factors exhibited notable distinctions. However, cross-tabulation analysis indicated that 47% of European males fly four or more times a year, which is lower than males from the Americas (58.3%) but higher than those from

Asia (31.4%) and Africa (15.3%). The majority of European females (32.6%) travel on average twice a year. Both European males (59.1%) and females (51.6%) show a strong inclination toward adopting airline FFPs. In contrast, African participants (male = 35.3%, female = 35.4%) indicated lower FFP membership.

Older generational cohorts, such as baby boomers, travel more frequently, while younger cohorts show higher inclinations toward FFP adoption. This trend is consistent across ethnic/racial origins, except for Asians, who travel four or more times a year less frequently than their counterparts from other regions. Notably, 60.2% of European Gen Z (18-25 years) do not identify as FFP members. Given the substantial presence of younger demographics, airlines must adapt to meet their preferences, as they will dominate travel demographics in the future, as noted by Grous (2019). This suggests a need for tailored marketing strategies targeting both older frequent travelers and younger groups inclined toward FFP membership. Research by Nieves *et al.* (2016) supports that older individuals travel more as they age, highlighting a crucial market segment for airlines.

Higher educational qualifications correlate with more frequent air travel. Individuals with Master's degrees or higher travel more frequently than those with a high school diploma. However, education level does not significantly impact attitudes toward FFP membership adoption. This suggests that while education influences travel frequency, it does not necessarily affect the likelihood of joining an FFP.

While post-hoc tests for marital status were not performed, cross-tab results reveal significant insights. For instance, 52.3% of married respondents in Europe travel four or more times a year, compared to 34.9% of single/unmarried individuals. A majority of Europeans (single/unmarried = 51.2%, married = 72.7%) are FFP members. In contrast, most singles from Asia and both married and single individuals from Africa are not FFP members. Understanding marital status can inform effective marketing strategies, according to Rahim (2018) and Yaylali *et al.* (2016). Ukpere *et al.* (2012) further emphasize marital status as a key demographic variable shaping airline preferences.

Household income significantly impacts air travel frequency. Individuals earning less than $14,999 fly less frequently compared to those earning higher incomes. Significant differences in travel frequency were observed between individuals earning less than $14,999 and those in higher income brackets, such as $41,000-$49,999, $50,000-$99,999, and above $100,000. This indicates that lower-income individuals have fewer travel opportunities, likely due to financial constraints. Interestingly, lower-income individuals showed a higher tendency to adopt FFP membership. Those earning less than $14,999 exhibited higher FFP membership rates compared to higher-income groups. This suggests that lower-income individuals, despite fewer travel opportunities, perceive FFPs favorably and are more inclined to become members. Airlines could leverage this by offering tailored FFP incentives and benefits that resonate with lower-income individuals, potentially increasing FFP enrollment and travel frequency within this demographic.

Initially, occupation seemed to significantly impact air travel frequency and FFP membership attitudes, but post-hoc analysis contradicted this for FFP adoption. While occupation influences air travel frequency, it does not significantly affect FFP adoption attitudes. This discrepancy is likely due to income differences associated with different occupations. Higher-income occupations may correlate with more frequent travel but not necessarily with FFP membership.

Managerial implications

The findings of this study emphasize the critical role of customer-oriented segmentation strategies based on sociodemographic profiles in enhancing airline marketing effectiveness. Airlines operate in an increasingly competitive landscape where customer loyalty and retention are key drivers of profitability. To optimize their marketing strategies, airlines should adopt data-driven segmentation approaches that group customers with similar travel behaviors, preferences, and FFP adoption tendencies. This aligns with the recommendations of Rahim (2018), who underscores the importance of market segmentation in tailoring airline services to meet specific passenger needs. Given the study's insights on the varying attitudes toward FFPs across different sociodemographic groups, airlines should design personalized loyalty programs that cater to the unique expectations of diverse passenger segments. Traditional one-size-fits-all loyalty schemes may not be effective for all travelers; therefore, tiered benefits, customized rewards, and targeted incentives should be developed based on factors such as age, income level, travel frequency, and occupation. For example, younger travelers (Gen Z and Millennials) may be more inclined toward experience-based rewards such as exclusive airport lounge access, event invitations, or travel discounts on partner services, while business travelers may value flexible rebooking options, priority boarding, and additional baggage allowances. High-income passengers may respond better

to elite status perks and premium-class upgrades. By leveraging sociodemographic insights, airlines can boost FFP enrollment rates and increase passenger retention, thereby securing long-term customer relationships and maximizing revenue from repeat travelers (Medina-Muñoz *et al.* 2020).

A major managerial takeaway from this study is the need for precision-driven marketing campaigns. Airlines should move beyond generic advertising and instead employ personalized digital marketing strategies that align with the distinct behaviors of different customer groups. Social media analytics, AI-driven customer profiling, and CRM tools can be utilized to refine targeting efforts. For instance, income-based segmentation can help airlines promote premium services to high-earning travelers while offering budget-friendly deals to price-sensitive passengers. Age-based targeting can guide messaging on digital platforms, ensuring that younger travelers engage with interactive content while older travelers receive personalized email offers. Geographical segmentation enables airlines to promote routes and services that align with the travel habits of customers from specific regions. By using big data analytics and AI-driven insights, airlines can craft highly relevant promotional content, increasing engagement rates and optimizing marketing expenditures (Oyewole 2008; 2020; Woyo *et al.* 2019).

In an industry where differentiation is often price-driven, airlines can enhance their competitive positioning by offering tailored experiences based on sociodemographic insights. Airlines that understand the unique motivations, expectations, and spending behaviors of various customer groups can create distinct value propositions that set them apart from competitors. For example, airlines could develop customized travel bundles for frequent leisure travelers, offering discounts on family vacations, adventure trips, or cultural experiences, while business travelers could benefit from corporate loyalty tiers that offer flexible booking options, last-minute flight changes, and networking perks such as co-working spaces at airports. A customer-centric approach not only fosters stronger brand loyalty but also enhances the passenger experience, leading to higher customer satisfaction and long-term profitability (Pascual and Cain 2022; Shaw 2016).

The airline industry is continuously evolving, with changing consumer expectations driven by technology, sustainability concerns, and shifts in travel behavior. Airlines must remain agile and responsive to these changes by integrating real-time consumer feedback loops into their decision-making processes. For instance, airlines can conduct regular customer satisfaction surveys segmented by demographic factors to fine-tune service offerings. AI-driven chatbots and virtual assistants can personalize customer interactions, improving engagement and streamlining the booking experience. Airlines should also invest in green FFP incentives aligned with Sustainable Development Goal (SDG) 12 (Responsible Consumption and Production) and SDG 13 (Climate Action) to attract environmentally conscious travelers. By leveraging sociodemographic analytics, airlines can future-proof their business models, ensuring that they remain competitive and responsive to the evolving needs of air travelers (Berry 1983; Law 2017). In conclusion, the study underscores the importance of sociodemographic-driven market segmentation in shaping airline marketing strategies, enhancing FFP adoption, and strengthening customer engagement. Airlines that effectively leverage these insights can achieve higher customer loyalty, optimized marketing return on investment (ROI), and stronger brand differentiation in a competitive aviation market.

Recommendations and limitations of the study

This study examined how sociodemographic attributes of airline passengers influence both the frequency of air travel and their attitudes toward adopting airline FFP memberships, offering valuable insights into consumer behavior within the aviation industry. While previous research has largely focused on service quality, ticket pricing, and destination preferences (Medina-Muñoz *et al.* 2020; Naletina *et al.* 2019), there remains a gap in understanding how demographic factors shape travel patterns and loyalty program adoption. By addressing this gap, the study contributes to a more comprehensive view of airline marketing strategies and customer segmentation.

Beyond its direct implications for airline management, the findings align with broader global sustainability initiatives, particularly the United Nations SDGs. The study is relevant to SDG 12 as it highlights the need for airlines to design loyalty programs that encourage more sustainable travel behaviors. Traditional FFPs have primarily focused on rewarding passengers based on travel frequency and spending patterns (Pascual and Cain 2022). However, there is growing potential for airlines to restructure these programs to incentivize environmentally friendly choices, such as selecting flights operated by fuel-efficient aircraft, offsetting

carbon emissions, or opting for routes with lower environmental impact. By incorporating sustainability-driven incentives, airlines can play a role in promoting responsible consumption in air travel.

Moreover, the study's findings are also linked to SDG 13, given that the aviation sector is a significant contributor to global carbon emissions (IATA 2022). Understanding the demographic profiles of frequent travelers and their attitudes toward FFPs can aid in the development of policies aimed at reducing the environmental footprint of air travel. For instance, airlines could implement FFP structures that reward passengers who choose sustainable aviation fuels, participate in carbon offset programs, or reduce unnecessary short-haul flights. Research has shown that frequent travelers, particularly business travelers, account for a disproportionate share of aviation-related emissions, making targeted strategies within loyalty programs an effective way to encourage sustainable behavior (Gössling and Nilson 2010). Future studies should explore the effectiveness of sustainability-linked loyalty incentives and assess their impact on traveler decision-making.

While this study provides important insights into the influence of sociodemographic factors on air travel frequency and the adoption of FFPs, several methodological and contextual limitations must be acknowledged to contextualize the findings and inform avenues for future research.

A primary limitation relates to the sampling approach employed. The study utilized a non-probability convenience sampling method, with participant recruitment conducted predominantly via social media platforms such as LinkedIn and Facebook. While this approach facilitated efficient data collection from a diverse pool of respondents, it inherently introduces sampling bias. Individuals active on professional or social platforms are more likely to be urban-based, digitally literate, and socioeconomically advantaged, which limits the representativeness of the sample. Consequently, the study's findings may disproportionately reflect the behaviors and preferences of a more affluent, educated, and connected segment of airline passengers, thereby constraining the generalizability of the results to broader or more heterogeneous populations.

In addition, the sample size and the cross-sectional nature of the data impose further limitations. While cross-sectional designs are effective for examining associations at a single point in time, they do not capture temporal variations or allow for causal inference. Changes in travel behavior and loyalty program engagement over time, particularly in response to dynamic factors such as pandemics, economic fluctuations, technological disruptions, or shifts in airline strategy, are not accounted for in this design. Longitudinal studies would be better suited to identify trends, behavioral shifts, and evolving customer preferences in the airline industry.

The reliance on self-reported data introduces another methodological concern. Survey responses are subject to recall inaccuracies and social desirability bias, especially when participants are asked to report on travel frequency or loyalty program participation. This may lead to overestimation or underestimation of key behavioral indicators. Future research could benefit from integrating more objective data sources, such as loyalty program membership records or actual flight booking data, either through collaboration with airlines or through the use of anonymized datasets, to enhance data reliability and validity.

Furthermore, the study does not disaggregate findings based on geographic or cultural contexts, despite drawing participants from multiple countries. Given that air travel behavior and FFP engagement are likely shaped by regional norms, regulatory environments, and cultural attitudes toward loyalty and travel, the lack of regional stratification may obscure important variations. Future research should consider comparative cross-national analyses or stratified sampling to better understand how contextual factors mediate demographic influences on airline consumer behavior.

CONCLUSION

While this study makes a meaningful contribution to the literature on airline marketing and consumer segmentation, its findings should be interpreted with caution in light of the methodological constraints outlined above. Addressing these limitations through more representative sampling, longitudinal designs, and expanded variable frameworks will be essential for future research seeking to build more generalizable and policy-relevant insights into the evolving dynamics of air travel behavior and loyalty program engagement.

CONFLICT OF INTEREST

Nothing to declare.

AUTHORS' CONTRIBUTION

Conceptualization: Koech AK and Njoya ET; **Methodology:** Koech AK; **Software:** Koech AK; **Validation:** Koech AK and Njoya ET; **Formal analysis:** Koech AK; **Investigation:** Koech AK and Njoya ET; **Resources:** Njoya ET; **Data Curation:** Koech AK and Njoya ET; **Writing - Original Draft:** Koech AK; **Writing - Review & Editing:** Koech AK and Njoya ET; **Supervision:** Njoya ET; **Final approval:** Koech AK.

DATA AVAILABILITY STATEMENT

Data used and/or analyzed during the current study are available from the corresponding author on reasonable request.

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