

# Understanding The Relationship of Greenwashing and Consumer Behavior: Case Study of the Airline Sector in the US

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## Abstract:

**Introduction:** The aim of this study was to examine how greenwashing practices, environmental initiatives, and consumer awareness mediate the relationship between perceived authenticity and consumer behavior in the U.S. airline sector.

**Method:** A quantitative design was employed, with data collected from 385 U.S. airline consumers, including students, travel vloggers, business professionals, and corporate employees. Responses were gathered using a structured Likert-scale survey and analyzed through Partial Least Squares Structural Equation Modelling (PLS-SEM) using SmartPLS.

**Results:** Results indicated that consumer awareness ( $\beta = 0.413$ ;  $p < 0.001$ ), greenwashing practices ( $\beta = 0.194$ ;  $p < 0.001$ ), and perceived authenticity ( $\beta = 0.177$ ;  $p < 0.001$ ) significantly influenced consumer behavior. However, environmental initiatives had an insignificant direct effect ( $\beta = 0.063$ ;  $p < 0.218$ ). Mediation analysis revealed that environmental initiatives exerted a significant indirect effect ( $\beta = 0.139$ ;  $p < 0.005$ ), indicating full mediation.

**Conclusion:** The findings suggested that environmental programs influence consumer behavior more strongly when perceived as authentic, whereas exaggerated or ambiguous claims diminish their impact on airline passengers.

**Keywords:** Greenwashing, green consumerism, environmentalism, perceived genuineness, green, consumer sensitivity, sustainability, credibility, airline business, U.S. airline business, corporate socio-responsibility.

## 1. INTRODUCTION

Within the past few years, environmental concerns have gained massive relevance, affected consumer expectations and forced airlines to pursue a more visibly sustainable approach, as also reflected by (Bläse *et al.*, 2024). In perspective, (Leal *et al.*, 2023) argued that the airline industry in the United States is often known as the second-largest source of emissions into the air. The airline industry, one of the most emission-intensive industries in the United States, is increasingly viewing the question of its environmental influence. In response, airlines have been increasingly relying on green marketing to enhance their ecological image and address the demands of the sustainability-conscious consumers stressed by (Avirutha, 2025). This change of strategy is indicative of regulatory pressures and the increasing demand among passengers to have environmentally friendly ways of traveling.

This intensified attention to sustainability, however, has also resulted in a boom of greenwashing in which companies inflate or falsify their environmental performance, which usually results in ethical and practical issues suggested by (Mosteller & Deale, 2024) as well. This concern is especially severe in the U.S. airline industry since the air industry's environmental communication is often faster than the real performance (Neureiter & Matthes, 2023). An example of this is that airlines usually discuss carbon-offset initiatives or fuel-efficient technologies. Still, as unveiled by (Hartmann *et al.*, 2023), their customers often tend to perceive such messages ambiguously, unverifiably, or exaggeratedly, reducing trust and a negative attitude towards the brand. The lack of regulatory transparency is another factor that increases this credibility gap, as it becomes hard to assess the validity of the sustainability statements by passengers stressed by (Sim & Kim, 2024).

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Consumer trust is lost in the U.S. airline branding due to the discrepancy between the announced environmental work and the practice of actual sustainability. Consequently, consumers can fail to recognize the validity of the initiatives and the misleading messages, which impacts their decision-making and attitude toward the industry (Guix *et al.*, 2022; Rosario, 2024). Managing these behavioral reactions is critical, especially as sustainability is not a branding choice, but a business requirement among airlines. Further, although previous investigations, such as (Korba *et al.*, 2023; and Patino-Artaza & Suau-Sanchez, 2025), have been conducted on greenwashing in the general business population, there is little research done specifically on the response of U.S. airline clients to environmental claims. Also, the mediating position of greenwashing behavior, consumer awareness, and ecological initiatives between perceived authenticity and consumer behavior is a crucial element of consumer judgment screening, which is under-researched in aviation.

Therefore, this study is significant as it contributes to central theoretical, empirical, policymaking, and regulatory contributions. In terms of theory, this research contributes to the existing knowledge on green marketing and perceived authenticity in behavioral frameworks of greenwashing effects. The empirical contributions of the study are also substantial, as it offers sector-specific evidence regarding the direct effect of greenwashing, environmental initiatives, and consumer awareness, anchoring on consumer behavior in the U.S. airline market, as well as the mediating role in the relationship between perceived authenticity and consumer behavior. Lastly, the research provides practical implications to the regulators and policymakers by providing more stringent measures in environmental communication to ascertain transparency, accountability, and consumer protection.

## 2. LITERATURE REVIEW

### 2.1. Hypotheses Development

Greenwashing refers to deceiving individuals about the business's environmental track record through false and baseless statements. This issue has become a significant concern, and nowadays it is felt by all industries, particularly those where businesses are growing more environmentally conscious (Hesse & Rünz, 2022). Greenwashing may appear in various ways, such as deceiving marketing campaigns, vague wording, and selective disclosures of environmental data (Baxter *et al.*, 2024; He *et al.*, 2023). The analysis of its foundation principles of greenwashing is the foundation on which the extensive influence of the strategy on consumer behavior is discerned, particularly when an industry has a considerable environmental footprint.

In this study, the greenwashing is construed as the perceived greenwashing by consumers and not as the factual deceptive practices that have been proven to be so. Building on signaling theory, the environmental claims of firms even in the case of vague or symbolic ones serve as positive signals in the context of high information asymmetry, including the US airline industry, where buyers lack the knowledge to evaluate the

technical sustainability performance unveiled by (Baxter *et al.*, 2024; He *et al.*, 2023; Galhoz, 2023) also. Consequently, consumers view such assertions as indications of environmental commitments as opposed to fraud, on which they react favorably at the behavioral level. The attribution theory implies that negative reactions appear only when it is obvious that claims are deceiving, as revealed by (Hesse & Runz, 2022). As such, positive impact implies low consumer awareness and acceptance of low green marketing statements, as opposed to condoning deceptive behavior.

**H1:** There is a statistically significant impact of greenwashing practices on consumer behavior in the airline sector of the USA

The high carbon emissions level, reliance on fossil fuels, the above-mentioned complexity of operations, and high strategic reliance on multiple stakeholders provide the airline industry with its own challenges to meet sustainability (He *et al.*, 2023). Airlines are fond of in-flight carbon offset schemes, fuel efficiency technologies, or other green schemes; however, it is still doubted whether they contribute much to sustainability (Abadie *et al.*, 2024). It leads to the difference between consumer expectations and airline realities, a real environment where greenwashing can occur (Alizadeh *et al.*, 2024). Having the context provided through the assessment of corporate sustainability arguments, understanding the specific environmental issues within the airline industry makes this industry an experimental field (He *et al.*, 2023).

Hence, based on above literature arguments, it can be said that despite of ensuring ecological initiatives for instance, fuel-efficient technologies, and carbon-offset scheme, the actual outcomes airlines related to sustainability remain uncertain which also created a perceptual gap amid consumer anticipations and operational reality as stressed by (Abadie *et al.*, 2024; He *et al.*, 2023) as well. From the signaling theory perspective, these initiatives act as signals planned to impact consumers' judgments. However, when consumers question the credibility of such signals, their attitudes and behavior shift accordingly towards particular airlines. Consequently, environmental initiatives are anticipated to impact consumer behavior, which leads to the formation of the second hypothesis of the study:

**H2:** There is a statistically significant impact of environmental initiatives on consumer behavior in the airline sector of the USA

Several variables, such as trust, perceived authenticity, and accessibility of transparent information, in response to environmental claims, determine consumer behavior. Greenwashing companies usually generate suspicion, reduce brand names, and generate adverse buying choices, which is argued by (Mr. & O'Connell, 2024; Papagiannakis *et al.*, 2024). Cost-effective environmental policies, on the other hand, can establish consumer confidence and build long-term relationships (Oates, 2020). Analyzing the perception of consumers towards and their reactions to environmental messaging with reference to greenwashing unravels bigger implications of environmental messaging about awareness and consumption behavior (Kwon *et al.*, 2024).

(Oates, 2020) asserted that if the perceived authenticity of the passengers is translated well into favorable outcomes, the passengers may have a positive perception of the airline, especially when their environmental claims are genuine. This implies that any suspicion about the authenticity of greenwashing behavior from consumers in the airline industry may influence consumer behavior. The arguments emerging from the findings of (Mr. & O'Connell, 2024; Papagiannakis *et al.*, 2024) signified that a crucial role is played by consumer awareness in formulating responses to ecological claims, as postulated by the Theory of Planned Behavior, where informed attitudes derive accountable as well as responsible decision-making articulated by (Papagiannakis *et al.*, 2024) as well. When consumers possess detailed awareness of ecological impacts, they are better positioned to critically assess the airlines' sustainability messages, reducing vulnerability to misleading claims, as (Mr. & O'Connell, 2024) argued. The authors also discussed the context of consumers, where they authenticate the claims made by the companies regarding the environmental initiatives. Moreover, higher consumer awareness enhances trust in authentic initiatives while augmenting consumer behavior, as (Kwon *et al.*, 2024; and Oates, 2020) explain. Therefore, consumer awareness is anticipated to substantially impact behavioral outcomes regarding choosing sustainable airlines regarding perceived authenticity. These arguments lead to the formulation of the third and fourth hypotheses of the study, where greenwashing practices, environmental initiatives, and consumer behavior are modelled as mediating variables rather than dimensions. The reason behind treating them as distinct independent variables is associated with the fact that each construct represents a discrete concept and this treatment of the variables has helped to preserve the theoretical rigor of the construct.

**H3:** There is a statistically significant impact of consumer awareness on consumer behavior in the airline sector of the USA

**H4:** There is a statistically significant mediating effect of green washing practices, environmental initiatives, and consumer awareness on perceived authenticity and consumer behavior in the airline sector of the USA.

**H4a:** There is a statistically significant mediating effect of green washing practices on perceived authenticity and consumer behavior in the airline sector of the USA.

**H4b:** There is a statistically significant mediating effect of environmental initiatives between perceived authenticity and consumer behavior in the airline sector of the USA.

**H4c:** There is a statistically significant mediating effect of consumer awareness between perceived authenticity and consumer behavior in the airline sector of the USA.

## 2.2. Research Gap

However, although the body of research about greenwashing and its consequences has grown, gaps in this research still exist, especially regarding the airline sector. However, most studies of greenwashing focus on greenwashing

in general consumer goods, with little work on high-impact sectors such as aviation (Sanguinetti & Amenta, 2022). One additional aspect is that very little empirical research looks into how greenwashing particularly impacts consumer trust and decision-making in the U.S. airline industry (Bakır, 2023). Additionally, previous studies identified challenges of greenwashing, but limited studies of actionable strategies, which are exceptionally functional to address airlines' challenges regarding the environment and operations. Filling these gaps, this study will address greenwashing in the airline sector, investigate consumers' responses to greenwashing disclosures, and provide industry-specific measures to increase transparency and accountability.

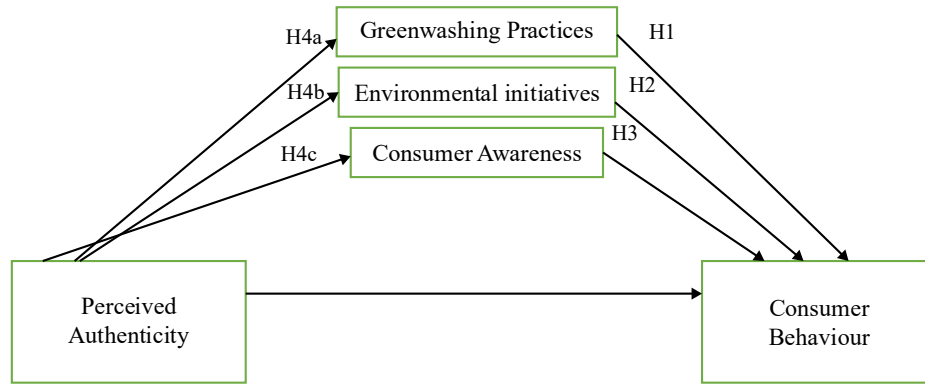
## 2.3. Conceptual Framework

The current study develops effect-based instead of correlational hypotheses as it is based on an explanatory research design which is driven by theory and targeted at investigating the directional associationship among constructs. Previous studies on greenwashing, consumer awareness, and authenticity reflect that these factors dynamically impact consumer behavioral responses instead of just co-varying with them. Consequently, the study applies Partial Least Squares Structural Equation Modelling (PLS-SEM), which is mainly appropriate for testing and analyzing predictive and causal paths across the multifaceted models. Steady with this methodological approach, the hypotheses are formulated and a conceptual framework is drawn, (Fig. 1), to evaluate the magnitude as well as direction of effects, which guarantees coherence among the theoretical framework of the study, hypothesis formation, and analytical strategy.

## 3. METHODOLOGY

This research uses a quantitative design, utilizing structured surveys to investigate the relationship between greenwashing practices and consumer behavior in the U.S. airline sector. The research utilizes a cross-sectional design to obtain data at one point in time to present a snapshot of consumer attitudes and behavior, which is also suggested by (Ghanad, 2023). This research design is helpful in achieving the study's objectives to identify a cause-and-effect relationship among variables. Eventually, based on the significance or insignificance of the result, hypotheses can be tested.

Following the quantitative research design, the data is collected using primary data collection techniques and a structured questionnaire containing closed-ended questions. The questionnaire is divided into 5 sections: Greenwashing practices (Liu, 2024), Environmental initiatives (Taufique *et al.*, 2016), Consumer Awareness (Han *et al.*, 2020), Consumer behavior (Çabuk *et al.*, 2019), and Perceived authenticity. The items under every construct are measured using a 5-point LIKERT scaling questionnaire from (1) strongly disagree to (5) strongly agree, which is suggested by (Velte, 2023) as well as an effective tool to collect quantifiable data regarding particular research problems, as depicted in Appendix 1. It is significant to specify that the greenwashing



**Fig. (1).** Conceptual framework

scale captures perceptions of consumers of airlines’ environmental communication and promotional claims, instead of objectively confirmed or deliberate environmental deception. An online questionnaire is distributed through email and social media platforms to gather data from as many people as possible. Since the survey instrument includes validated scales from other literature, it maintains content validity and reliability (Montgomery *et al.*, 2024). With a pilot sample of (n= 50) participants, the questionnaire is pre-tested before full-scale data collection to identify and rectify problems related to clarity, length, and design. It used Cronbach's Alpha, which provides a reliability score above 0.7.

The study aimed at a target population of U.S. consumers who travelled with airlines in the past 3 years, thus giving the data relevance to the current market dynamics. The sample size, considering the research, is deemed to be 385 participants from the U.S. airlines, such as customers and employees. The sample size of the study is computed using the Z-probability formula, which is also suggested by (Ghanad, 2023).

$$n = (Z^2 * p * (1 - p)) / e^2$$

Where:

- n = required sample size
- Z = Z-value corresponding to the confidence level
- p = estimated proportion of the population
- e = margin of error
- Z = 1.96 (for a 95% confidence level)
- p = 0.5 (assuming maximum variability)
- e = 0.05
- Substituting the values:
- $n = (1.96^2 * 0.5 * (1 - 0.5)) / (0.05^2)$
- $n = (3.8416 * 0.25) / 0.0025$
- $n = 0.9604 / 0.0025$
- $n = 384.16$  rounded to 385.

Even though the sample included respondents from varying professional and occupational groups, including students, travel vloggers, and business travelers, the observed impacts are probably motivated by the common exposure to the concept of airline sustainability communication as opposed to occupation-specific interpretations. In the US airline industry, mass marketing is the means of conveying environmental claims so that the informational environments of consumers are rather homogenous. According to the previous study, such as (Guix *et al.*, 2022), individual differences have a weak effect on behavioral response when sustainability information is standardized and of low transparency. The positive effect of greenwashing practices, therefore, can be generalized to a consumer-level heuristic processing mechanism as opposed to fragmented patterns of perception. It helps to justify the strength of findings even in the case of demographic heterogeneity.

In the case of collecting primary data, the problem of selection and non-response bias also arises, which requires mitigation as stated by (Gupta & Singh, 2024). Therefore, to mitigate the issue of selection bias, the respondents were approached at different social media platforms and official tourism-related social media pages of online travel agents (OTA) like Booking.com. Participants with other occupational and ethnic backgrounds and distinct personal characteristics, such as age groups and gender, were approached. This technique allowed us to induct participants from diverse backgrounds, providing a variety of responses. Further, to mitigate the issue of standard method variance (CMV), the technique was applied to examine the occurrence of a significant difference between early (n1 = 30) and late (n2 =30) respondents, where an insignificant difference specified no non-response bias. The sampling was based on a stratified sampling procedure to minimize the sampling bias and provide a proportional representation of the central demographic groups suggested by (Duckett, 2021). The respondents were randomly selected in each of the strata according to age, gender, income level, and geographic region of the US. It allowed for guaranteeing that the diversity of air travelers is accurately represented by the sample throughout the United States, so that the external validity and generalizability are

more effective, which is also the major focus of de (Mello, 2024). There is also reduced over-representation of any group; the results of greenwashing perceptions and consumer behavior are not influenced by the imbalance in the demographics.

Structural Equation Modelling (SEM) driven by SMARTPLS software is utilized to analyze the data that is collected. For the ability to model complex relationships and test hypothesized paths within the conceptual framework, this tool was chosen. First, the data go through preliminary analysis, such as descriptive statistics, to give an overview of the sample characteristics and identify missing or unnatural data (Purwanto, 2021). Subsequently, PLS-SEM is conducted to assess direct effects and mediation effects between variables, which was applied in SEM.

In the first step of PLS-SEM, the measurement model in terms of reliability and validity was measured using CFA, which was comprised of Cronbach’s Alpha and Composite Reliability, considering threshold values of 0.7. Further convergent validity was tested using the Average Variance Extracted Method, considering a 0.5 threshold value, which is suggested by (Cheung, *et al.*, 2024) as well. Besides, discriminant validity in terms of variables' separability and conceptual overlapping was examined using the HTMT ratio against 0.85 as the threshold value guided by (Duckett, 2021).

In the last step, path coefficients were analyzed to gauge the direct and indirect relationships between variables in terms of mediation effects. Path coefficients were analyzed for significance in the bootstrapping technique of SmartPLS software, which led to detailed insights related to the strength and direction of associations. Furthermore, non-normal data is a common feature of survey responses, and SMARTPLS allows for this characteristic. The methodology uses rigorous data

collection methods coupled with advanced analytical techniques to generate reliable and action-oriented findings that help to illuminate the phenomena of greenwashing and consumer behavior within the airline sector.

Major ethical considerations have also been followed in the study for data collection, which include confidentiality, anonymity, informed consent and withdrawal rights. Informed consent was obtained from the participants using a debrief form and an informed consent form. Identifiable information was not collected from the participants to ensure anonymity and confidentiality. All participants were given withdrawal rights to leave the study at any point in time. Also, aligned with data protection regulations, all the data was stored in access control devices that could be accessed by the author only. Lastly, approval was also obtained from the internal review board (IRB).

#### 4. ANALYSIS AND DISCUSSION

##### 4.1. Demographic Profile

The statistical results in Table 1 depict the demographic profile of the participants. As per results, it can be observed that, among (n = 385) respondents, (55.32%) are male and (46.68%) are female participants. Among these participants, (18.70%) lies in the age bracket of 18-25 years, (33.25%) 26-35 years, (28.05%) 36-45 years and (20%) 46-55 years. Whereas, with regards to occupation of the participants, (25.97%) were students, (21.30%) were Travel Vloggers, (25.75%) were Corporate Employees, and (27.01%) were Businessmen. Moreover, with regards to travelling frequency with airlines, (19.48%) travel once a month, (32.21%) twice a year, (25.97%) once a year and (22.08%) rarely.

**Table 1. Demographic profile analysis.**

Demographic Category		Frequency (n)	Percentage (%)
Gender	Male	213	55.32%
	Female	172	44.68%
Age Range	18-25	72	18.70%
	26-35	128	33.25%
	36-45	108	28.05%
	46-55	77	20.00%
Occupation	Students	100	25.97%
	Travel Vlogger	82	21.30%
	Corporate Employee	99	25.75%
	Businessmen	104	27.01%
Travelling Frequency	Once a Month	75	19.48%
	Twice a Year	124	32.21%
	Once a year	100	25.97%
	Rarely	85	22.08%

**4.2. Measurement Model Using CFA**

The measurement model has been assessed using CFA approaches, where Cronbach's alpha, composite, and average variance extracted (AVE) were used to test the reliability and validity as well. The results are depicted in Table 2.

As per the results depicted in Table 2, it can be observed that all constructs surpassed the suggested thresholds of 0.7 for reliability and 0.5 for AVE, which validated robust internal consistency and convergent validity. Factor loadings on all the items showed a range of 0.805 to 0.933, which means that every indicator is reflecting its latent construct. In particular, the robust reliability was demonstrated by Consumer Awareness, Consumer Behavior, Environmental Initiatives, Greenwashing Practices and Perceived Authenticity with the Cronbach alpha

ranging between 0.812 and 0.899 and composite reliability between 0.816 and 0.912. The satisfactory convergent validity across constructs was additionally determined with the help of the AVE values that differed between 0.727 and 0.831. In general, the CFA findings support the reliability and validity of the measurement model used and form an effective foundation on which additional structural investigation can be conducted to determine the correlation between greenwashing and consumer behavior within the U.S airline industry.

**4.3. Discriminant Validity**

Discriminant validity was evaluated with the help of the Heterotrait-Monotrait Ratio (HTMT). The results are depicted in Table 3.

**Table 2. Measurement model CFA.**

Latent Variables	Indicators	Factor Loadings	Cronbach's Alpha	Composite Reliability (rho_a)	Average Variance Extracted (AVE)
Consumer Awareness	CA1	0.891	0.881	0.883	0.808
	CA2	0.926			
	CA3	0.879			
Consumer Behavior	CB1	0.927	0.899	0.899	0.831
	CB2	0.904			
	CB3	0.863			
Environmental Initiatives	EI1	0.805	0.812	0.816	0.727
	EI2	0.897			
	EI3	0.854			
Greenwashing Practices	GP1	0.880	0.852	0.854	0.772
	GP2	0.898			
	GP3	0.857			
Perceived Authenticity	PA1	0.914	0.893	0.912	0.823
	PA2	0.933			
	PA3	0.874			

**Table 3. Discriminant validity.**

Variable	Consumer Awareness	Consumer Behavior	Environmental Initiatives	Greenwashing Practices
Consumer behavior	0.733	-	-	-
Environmental initiatives	0.557	0.472	-	-
Greenwashing practices	0.720	0.617	0.626	-
Perceived authenticity	0.497	0.486	0.352	0.281

As shown in Table 3, all the HTMT values are found to be less than the conservative value of 0.85. This indicates that constructs in a model are distinct and can be conceptually distinguished from one another. The value of the highest HTMT was seen between Consumer Awareness and Consumer Behavior (0.733) and between Consumer Awareness and Greenwashing Practices (0.720), which fell within acceptable limits, meaning that there was no conceptual overlap. In general, the findings confirm that Consumer Awareness, Consumer Behavior, Environmental Initiatives, Greenwashing Practices, and Perceived Authenticity and the terms of the interaction are empirically differentiated to prove the model's sufficiency and assure that the further structural analysis does not counter issues related to multicollinearity or conceptual redundancy.

**4.4. Path Coefficient Analysis**

The path analysis results in Table 4 indicates Consumer Awareness has a strong and statistically significant positive impact on Consumer Behavior ( $\beta = 0.413; p < 0.000$ ), whereas Greenwashing Practices ( $\beta = 0.194; p < 0.001$ ) and Perceived Authenticity ( $\beta = 0.177; p < 0.001$ ) also have significant positive effects which proves that awareness and authenticity and perceptions of green marketing practices contribute to consumer behavioral responses. The greenwashing practices have a positive influence on consumer behavior, which can be theoretically explained by taking into account the information environment and consumer cognition of the U.S. airline industry. Greenwashing in this study is the perceived environmental communication that is not objectively proved to

be deceptive. With high information asymmetry and high verification costs, as is the case with aviation sustainability, (Bakır, 2023) argues that even weak or symbolic claims to green can be interpreted as a positive signal, as explained by the signaling theory. As also reported by (Kaupa, 2022), most of the U.S. consumers do not possess the technical knowledge to analyze the data on emissions or the effectiveness of offsets and thus take green claims as an indication of effort and not as a gimmick. Also, according to the attribution theory, skepticism is only created when deception is identified. Therefore, the result is low consumer awareness and acceptance of low green marketing, and not acceptance of deceptive behavior.

On the other hand, the direct effect of Environmental Initiatives is insignificant ( $\beta = 0.063; p < 0.218$ ), implying that they are not predictors of consumer behavior on their own. In terms of mediation, the mediating effect of environmental initiatives was statistically significant through indirect effects ( $\beta = 0.139; p < 0.005$ ), showing full mediation since the direct path is insignificant. The rest of the mediating variables, that is, consumer awareness and greenwashing practices, were found to have an insignificant indirect effect between perceived authenticity and consumer behavior, indicating no mediation.

**4.5. Model Explanatory Power**

The model's explanatory power is measured by R-square and Adjusted R-squared values, which allow for the analysis of the predictive or explanatory power of predicting variance in the dependent variable by independent variables. The results are depicted in Table 5.

**Table 4. Path coefficient analysis.**

	Path Coefficients	T-Statistics	P Values
Consumer awareness -> Consumer behavior	0.413***	6.683	0.000
Environmental initiatives -> Consumer behavior	0.063	1.232	0.218
Greenwashing practices -> Consumer behavior	0.194***	3.380	0.001
Perceived authenticity -> Consumer behavior	0.177***	3.214	0.001
<b>Specific Indirect Effects</b>			
Perceived authenticity -> Consumer awareness -> Consumer behavior	0.013	0.197	0.844
Perceived authenticity -> Environmental initiatives -> Consumer behavior	0.139***	2.832	0.005
Perceived authenticity -> Greenwashing practices -> Consumer behavior	0.111	1.595	0.111

Note: \*: Significance at 10%; \*\*: Significance at 5%; \*\*\*: Significance at 1%

**Table 5. Model explanatory power.**

Variable	R-Square	R-Square Adjusted
Consumer behavior	0.510	0.502

As per results depicted in Table 5, it can be observed that, 0.510, that is 51% variation in consumer behavior, is predicted by greenwashing practices, environmental initiatives, and consumer awareness in the airline sector of the USA.

## 5. DISCUSSION

The results of this research are helpful in understanding the interaction of greenwashing practice, environmental programs, consumer consciousness, and perceived authenticity to determine consumer behavior in the U.S. airline industry. The findings of the study indicate that H1, which is based on the positive and significant impact of the greenwashing practices on consumer behavior, is substantiated. This observation indicates that consumers in the American airline industry are more sensitive to environmental proclamations, although these claims are not necessarily always fully authentic. Despite the fact that greenwashing has been extensively theorized as a way to undermine trust, the positive outcome, that was witnessed in this study is a possibility that could be explained by the structural characteristics of the airline market in the US. Airlines are in a high degree of consolidation, with little bargaining power by consumers, and sustainability information, however concealed, has served as a heuristic shortcut as opposed to a highly scrutinized assertion. Previously existing studies, such as (Baxter *et al.*, 2024), indicate that when the environmental literacy of consumers is low or when they are overwhelmed by the information, they can have a positive reaction even towards the weak or exaggerated sustainability cues. Carbon-offset programs and long-term promises of being net-zero by 2050 that are actively advertised by major airlines in the U.S. airline setting also often appear to be viewed by consumers as real signs of environmental responsibility despite continued criticism of their practical relevance (Kaupa, 2022). According to a signaling theory perspective, those claims can serve as symbolic green signals to modify consumer decisions in situations of information asymmetry, where the passengers do not have the technical expertise or the interest to check the sustainability performance. Therefore, the fact that what is considered greenwashing in the measurement sense can be viewed by the consumers as genuine green marketing and not deception. In line with this position, (Guix *et al.*, 2022) note that the lack of environmental knowledge and the lack of regulatory transparency promote the acceptance of low sustainability assertions. The beneficial behavioral attitude, therefore, represents consumer ignorance or resignation, rather than approval of the deceptive behaviors. The outcome parallels the results of (de Mello, 2024), who hypothesized that repeated exposure to greenwashing may lead to consumer behavior that is counterintuitive, skeptical, and also has an impact on evaluating green responsibility. Nevertheless, contrary to the research in European and Asian environments, where greenwashing frequently results in consumer rejection and mistrust, such as (Velte, 2023; and Vangeli *et al.*, 2023), consumers in the U.S. are found to give less consideration to greenwashing practices. Such a discrepancy can be explained

by the cultural and industrial factors, especially the nature of the U.S. airline industry, which is highly competitive and marketing-focused, and sustainability messages are likely to be accepted as a part of brand differentiation, but not as blatant deception.

H2, which was examined to confirm the effect of environmental initiatives on consumer behavior, is rejected. This finding contradicts some previous studies, including (Bakır, 2023; and Sorsa & Bona-Sánchez, 2024), which identified environmental initiatives as powerful predictors of consumers with environmentally friendly airline preferences, in particular in those markets with sustainable aviation visible as a consumer issue. These findings can also be related to the theory of planned behavior, which postulates that environmental initiatives are required strengthen positive attitudes and intentions towards sustainable airlines. However, the insignificant impact highlights that consumers tend to doubt the credibility or effectiveness of these initiatives, which decreases their impact on perceived behavioral control and subjective norms, which eventually deteriorate pro-ecological purchase intentions. The insignificant impact could be explained, however, in the U.S. context by the skepticism of consumers and a low level of disclosed sustainability, which is suggested by (Sinisalo, 2020) as well. Several American airlines advertise carbon offset and biofuel investment, which seem distant or unreachable to the general consumer. The capital-intensive and regulation-heavy nature of the airline industry is also a limiting factor to visible environmental improvement in the context, curtailing consumer interaction and behavioral modification regardless of their awareness of such activity, as reflected by (Sim & Kim, 2024) as well.

H3, which states that there is a significant impact of consumer awareness on consumer behavior, is accepted. This result confirms the previous studies by (Rosario, 2024; and Sanguinetti & Amenta, 2022) that stated the importance of environmental consciousness in determining responsible travel behavior. Nevertheless, the U.S. findings demonstrate a subtle sphere of consciousness because consumers are morally concerned with environmental problems but tend to make their airline choices based on convenience, prices, and reliability of services rather than ecology. This is an indication of the lack of breadth of green alternatives in the U.S. aviation market, as opposed to the regions such as Scandinavia, highlighted by (Purwanto, 2021), where sustainability is more of a policy and consumer-culture imprint.

H4, related to the mediating effect of consumer awareness, environmental initiative, and greenwashing behavior between perceived authenticity and consumer behavior, provides inconsistent findings, where only H4b is accepted. There is full mediation of environmental initiative between perceived authenticity and consumer behavior. This implies that environmental programs have greater effects on consumer behavior when observed as authentic, and exaggerated or ambiguous assertions have a lesser effect on the passengers of the U.S. airline industry. The result aligns with the ideas

presented by (Olk, 2021; and Papagiannakis *et al.*, 2024), who concluded that authenticity is a credibility filter that affects consumers in their perception of corporate environmental claims. Nonetheless, the relationships between the greenwashing practices and consumer awareness are not mitigated by the aspect of authenticity, meaning that consumers in the U.S. already have existing perceptions of these constructs regardless of the perceived authenticity.

The discovery of the full mediation signifies that the Environmental Initiatives is a suppressor variable with indirect effects being the opposite of the direct relationship between Perceived Authenticity and Consumer Behavior. In theory, this implies that in cases where consumers believe airline efforts to be authentic, authenticity has a direct positive effect on positive behavioral outcomes, but that in cases where these efforts are considered discrete cues, they can indeed have a counterproductive effect of generating skepticism or attributional questioning. According to (Elshaer *et al.*, 2025), sustainability activities create consumer distrust when they seem to be implemented as strategies instead of as value-based efforts. In the airline industry of the US, where carbon-footprint printing and zero-emission policies and promises have consistently been criticized, these initiatives can undermine the lasting impact of perceived authenticity by reminding consumers of the controversies in the industry, and thus acting as a suppressor. This counter trend conforms to Attribution Theory, which, according to (He *et al.*, 2023), suggests that consumers discount positive information when motives are perceived as self-interested. As a result, the full mediation demonstrates that Environmental Initiatives make the process in which the authenticity influences consumer behavioral responses more difficult instead of smoothing them.

## CONCLUSION

The study finds that the consumer behavior in the U.S. airline industry is determined by perception and awareness, rather than the mere existence of environmental initiatives. However, greenwashing practices are found to significantly impact consumer behavior in the U.S. airline industry. Effective environmental programs are not adequate to provoke behavioral change until they are communicated in a transparent and genuine manner. The most powerful driver is consumer awareness, but its influence is limited by the industrial reality, including the lack of sustainable travel alternatives. The mediating effect of authenticity underlines the trust, rather than information, as the determinant of behavioral consequences. Also, authentic, verifiable environmental commitment as opposed to performative marketing tends to determine competitive advantage in a more environmentally conscious airline market in terms of positive consumer behavior and consumer purchase intention eventually.

The study depicts that Greenwashing Practices, Consumer Awareness, and Perceived Authenticity substantially form

consumer behavior in the U.S. airline sector; at the same time, Environmental Initiatives alone are inadequate to drive consumer behavior. Results indicate that perceived authenticity plays a critical role as a mediator of consumer response and behavior, and that trust and credibility, and not just sustainability messages, are the driving force of consumer behavior. The findings underline the relevance of clear and verifiable environmental policies, provide a theoretical basis and practical solutions to airlines, and policy recommendations to regulators to increase consumer confidence.

## LIMITATIONS AND FUTURE DIRECTIONS

This study is limited by its focus on the U.S. airline sector; hence, its results are not generalized to other industries and regions with varying regulatory and cultural conditions. Causal inference is also hampered by the cross-sectional design, and self-reported data could be influenced by the social desirability bias. Future studies ought to use a longitudinal or experimental design to investigate changes in behaviors over time with the aim of confirming causal mechanisms. Regional airline comparative analyses might identify contextual differences, whereas qualitative research could enhance knowledge on the effect of authenticity and consumer trust on responses to corporate environmental communication and initiatives.

## POLICY IMPLICATIONS

The implications produced by the findings are essential to regulators and industry practitioners. Regulators need to make sure that environmental claims are clear and provable to reduce greenwashing and increase consumer confidence. Accountability in the U.S. airline industry can be enhanced by having clear disclosure standards and external audits on these standards. For the practitioners and regulators of the U.S. aviation sector, the findings reveal that sustainability communication should be based on authenticity and credibility. Airlines are to no longer pursue merely the symbolic measures but to incorporate the real environmental performance into the actual business and branding messages. Long-term positive consumer behavior can be achieved through investment in open communication, quantifiable results of sustainability, and educating customers on the value of sustainable practices, positioning brands above their competitors, and aligning industry trends with the changing expectations of customers towards sustainability.

## LIST OF ABBREVIATIONS

<b>AVE</b>	=	Average Variance Extracted
<b>OTA</b>	=	Online Travel Agent
<b>SMV</b>	=	Standard Method Variance
<b>SEM</b>	=	Structural Equation Modelling

**AUTHOR'S CONTRIBUTION**

G. M. T. contributed to the design and implementation of the study, contributed to the analysis of the results and the writing of the manuscript.

**ETHICAL APPROVAL & INFORMED CONSENT**

Major ethical considerations have also been followed in the study for data collection, which include confidentiality, anonymity, informed consent and withdrawal rights. Informed consent was obtained from the participants using a debrief form and an informed consent form. Identifiable information was not collected from the participants to ensure anonymity and confidentiality. All participants were given withdrawal rights to leave the study at any point in time. Also, aligned with data protection regulations, all the data was stored in access control devices that could be accessed by the author only. Lastly, approval was also obtained from the internal review board (IRB).

**APPENDICES**

**APPENDIX 1: QUESTIONNAIRE**

Sr.No	Variables	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
	<b>Greenwashing practices Adapted from (Liu, 2024)</b>	1	2	3	4	5
1	How far do you agree that you have loss trust on airlines due to their greenwashing activities?					
2	How far do you agree that the airlines use social media marketing for greenwashing?					
3	There is not a trace of how the airlines set up the environmental initiatives.					
	<b>Environmental initiatives. Adapted from (Taufique et al., 2016)</b>	1	2	3	4	5
4	When there is a choice, I always choose the airlines that contributes to the least amount of pollution.					
5	I strongly support that more environmental protection works are needed by US airlines.					
6	I perceive airlines' brand positively when they have environmental initiatives.					
	<b>Consumer Awareness. Adapted from: (Han et al., 2020)</b>	1	2	3	4	5
7	I know greenwashing in the airline industry exists.					
8	I choose airlines that I am aware of environmental issues and that this airline does business in a manner that is consistent with protecting the environment					
9	Before booking my flight, I read up on airline environmental claims.					
	<b>Consumer behavior Adapted from (Çabuk et al., 2019)</b>	1	2	3	4	5
10	I intend to buy tickets from eco-friendly airlines next time because of them positive contribution to the environment.					5
11	I chose to buy tickets from green airlines because of their environmental benefits.					
12	My decision to recommend an airline to somebody else is affected by environmental claims.					

**AVAILABILITY OF DATA AND MATERIALS**

The data will be made available on reasonable request by contacting the corresponding author [G.M.T].

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**CONFLICT OF INTEREST**

The author declares no conflicts of interest.

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**DECLARATION OF AI**

During the preparation of this work the author used ChatGPT for editing purposes. After using this tool, the author reviewed and edited the content as needed and take full responsibility for the content of the published article.

	Perceived authenticity	1	2	3	4	5
13	Airlines are believable on the environment.					
14	Before I use them, I ensure airlines' environmental claims are verified.					
15	When it comes to airline choice my trust is impacted by an airline's authentic sustainability claims.					

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