

Environmental Sustainability Practices in Airlines and Their Effects on Passenger Behavior

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Article Info	Abstract
<p>Received: 23.12.2025 Accepted: 20.04.2026 Published: 20.05.2026</p> <p>Keywords: Green Image, Passenger Satisfaction, Green Trust, Passenger Loyalty, Word of Mouth.</p> <p>Jel Code: M31</p> <p>Corresponding Author: Furkan KARAMAN</p> <p>Research Article https://doi.org/10.5281/zenodo.20297826</p>	<p>This study examines the effects of passenger perceptions of airline companies' environmental activities on consumer behavior using a quantitative research design. The literature indicates that environmental image, corporate social responsibility practices, environmental service quality, and perceived green value have been highlighted as determinants of consumer trust, satisfaction, and loyalty. However, the interactions of these variables in the airline context have been addressed only to a limited extent. Accordingly, this study empirically tests these relationships by applying reliability analyses, multiple regression models, and parallel mediation tests on data obtained from 450 passengers traveling in Turkey, using anonymized data sets taken from previous studies. The findings of the analysis show that green image (GI) has significant indirect effects on loyalty (LOY) and positive word-of-mouth (WOM) through passenger satisfaction (SAT) and trust (GT). The effects of satisfaction and trust variables on loyalty were found to be highly significant, supporting previous studies in the service marketing literature that emphasize the trust–satisfaction–loyalty continuum. The parallel mediation model reveals that perceptions of environmental activities are not limited to direct effects but also involve a multi-layered mechanism that shapes behavioral intentions through psychological evaluations. The research presents important findings for both airline management literature and practice by demonstrating that environmental sustainability-focused strategies contribute to long-term customer relationships through passenger trust and satisfaction.</p>

Introduction

The aviation sector is at the center of sustainability debates due to its high carbon emissions, intensive energy consumption, and various environmental externalities on a global scale. Data from the International Civil Aviation Organization (ICAO) shows that commercial aviation accounts for approximately 2–3% of global carbon emissions; projections indicating that this percentage could increase by 2050 further intensify environmental pressure on the sector (ICAO, 2023). The prioritization of themes such as climate change, sustainable development, and corporate environmental responsibility on the policy agenda has made airlines' environmental strategies more visible in the eyes of both the public and consumers (Gössling & Higham, 2021). In this context, airlines are implementing various environmental activities such as fuel efficiency programs, carbon offsetting initiatives, waste reduction practices, and sustainable supply chain management. The literature frequently emphasizes that such practices contribute not only to reducing environmental impacts but also to shaping consumers' perceptions and behavioral intentions toward the company (Chen, 2010; Han et al., 2019).

The increase in consumer environmental awareness has led to the strategic importance of environmental perceptions in marketing and customer relationship management in aviation, as in modern service industries. In particular, the effects of perceptual factors such as green image (GI), corporate social responsibility awareness (CSR), green service quality (GSQ), and perceived green value (GV) on behavioral outputs such as customer trust (GT), satisfaction (SAT), loyalty (LOY), and word-of-mouth communication (WOM) (Carroll, 1999; Chang & Fong, 2010; Grimmer & Woolley, 2014). For example, it has been found that environmental image contributes to loyalty by increasing consumer satisfaction and trust (Chen, 2010), perceived environmental responsibility positively influences attitudes toward the company (Bhattacharya & Sen, 2004), and perceived green value strengthens positive behavioral intentions toward eco-friendly brands (Han & Hyun, 2018).

In this context, the current study aims to examine the effects of environmental perceptions towards airline companies on key outcomes in the context of customer relationships within a comprehensive model. The effects of perceptual antecedents such as environmental image, corporate social responsibility awareness, environmental service quality, and perceived green value on trust, satisfaction, loyalty, and word-of-mouth communication were tested using quantitative data obtained from a sample of travelers in Turkey. In this regard, the study aims to contribute to the literature by revealing the reflections of environmental sustainability

on consumer behavior, while also producing important managerial insights for airline companies to optimize their environmental strategies in terms of customer experience and loyalty. Based on the theoretical framework, the study seeks to answer the following research questions:

RQ1: How do airline environmental activities influence passenger trust, satisfaction, loyalty, and word-of-mouth communication?

RQ2: Does green image influence passenger loyalty directly or through psychological mechanisms such as trust and satisfaction?

RQ3: Do trust and satisfaction play a mediating role in the relationship between environmental perceptions and behavioral outcomes?

These research questions guide the development of the conceptual model and hypotheses tested in the study.

Conceptual Framework / Theory

The airline industry, due to its high level of competition and its share of global carbon emissions, views sustainability practices not only as a legal requirement but also as a strategic element that strengthens brand image (Cowper-Smith & De Grosbois, 2011). In particular, the green image (GI) reflects consumers' perceptions of airline companies in terms of environmental responsibility, sensitivity to ecological balance, and sustainability efforts. The literature indicates that the green image has direct and indirect effects on consumer satisfaction, trust, and loyalty, while also encouraging word of mouth (WOM) communication (Hwang & Lyu, 2019). Corporate Social Responsibility (CSR) practices reveal the responsibilities of airline companies towards society in environmental, social, and economic dimensions. Chung, Park, and Lee (2022) found that CSR activities increase loyalty through passenger satisfaction, brand image, and trust; Han et al. (2020) found that environmental CSR strengthens WOM through service quality and emotional attachment. Considering CSR alongside an eco-friendly image reinforces loyalty by influencing both the rational and emotional dimensions of consumer perceptions. Green Service Quality (GSQ) is defined by the inclusion of environmental awareness in services provided before, during, and after flights. For example, fuel optimization to reduce carbon footprint, the use of recyclable materials, or waste management policies strengthen consumers' perception of service quality (Galhoz et al., 2024). GSQ is expected to have indirect effects on loyalty by increasing both satisfaction and perceived green value (GV). Perceived Green Value (GV) encompasses the benefits (economic, functional, and emotional) that consumers derive from environmentally friendly practices. When GV is high, consumers evaluate the benefits they derive from the service not only functionally but also ethically and environmentally. This increases trust (GT) and satisfaction (SAT) levels, supporting WOM and loyalty. Trust (GT) is the level of consumers' belief that the airline will fulfill its promises and is sincere in its environmental policies. In the literature, trust is defined as a critical determinant of loyalty and positive word-of-mouth communication (Han et al., 2020). Satisfaction (SAT) expresses the degree to which the consumer's expectations are met and is directly influenced by the green image, CSR practices, service quality, and perception of green values. The effect of satisfaction on loyalty and WOM has been repeatedly confirmed in both tourism and aviation literature (Chung et al., 2022). Loyalty (LOY) and Word of Mouth (WOM) are the final outputs of the conceptual framework. Loyal customers tend to make repeat purchases, while WOM allows them to share their positive experiences with their peers, organically strengthening the company's brand value. Especially in sectors requiring high service standards, such as airlines, WOM is one of the most reliable and effective means of marketing communication (Hwang & Lyu, 2019). In this context, the proposed conceptual model includes the direct and indirect effects of antecedent variables such as GI, CSR, GSQ, and GV on LOY and WOM through GT and SAT. Furthermore, the literature suggests that variables such as price perception, service experience duration, and passenger segment may play a moderating role in these relationships (Han et al., 2020).

The literature suggests that environmental image strengthens consumer trust and value perception; service quality is a critical determinant of satisfaction; and satisfaction and trust influence loyalty and positive word-of-mouth communication. In this context, the following hypotheses were tested:

H₁: Green image (GI) positively affects green trust (GT).

H₂: Green image (GI) positively affects satisfaction (SAT).

H₃: Perceived green value (GV) and green service quality (GSQ) positively affect satisfaction (SAT).

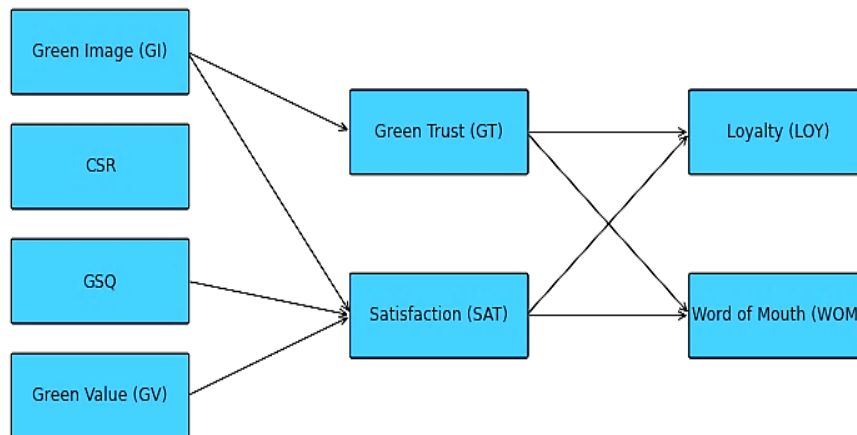
H₄: Green trust (GT) and satisfaction (SAT) positively affect loyalty (LOY).

H₅: The effect of green image (GI) on customer loyalty (LOY) is indirect (parallel mediation) through green trust (GT) and satisfaction (SAT).

H₆: Green trust (GT) and satisfaction (SAT) positively affect word-of-mouth communication (WOM).

Based on the theoretical background and hypotheses developed above, the conceptual model of the study is presented in Figure 1. The model illustrates the relationships between environmental perception variables, mediating mechanisms, and passenger behavioral outcomes.

Figure 1. Conceptual Model of the Study



The conceptual model presents the relationships between environmental perception variables, mediating mechanisms (trust and satisfaction), and passenger behavioral outcomes. Environmental activities are assumed to influence loyalty and word-of-mouth communication through psychological evaluation processes.

Method

This study was conducted using a cross-sectional research model designed within the quantitative research paradigm. A structured questionnaire was used in the data collection process, and measurements were made using Likert-type scales rated on a 1–5 scale, which are frequently preferred in social science research. The scale options “1 = Strongly disagree” and “5 = Strongly agree” represent the extreme values. The eight latent constructs included in the research model—green image (GI), corporate social responsibility awareness (CSR), green service quality (GSQ), perceived green value (GV), trust (GT), satisfaction (SAT), loyalty (LOY), and word-of-mouth communication (WOM)—each of which consists of three items, totaling 24 statements. In addition, categorical questions such as age, gender, education level, and income level were included in the survey to measure demographic variables.

The sample of the study empirically tests these relationships by applying reliability analyses, multiple regression models, and parallel mediation tests on data obtained from 450 travelers in Turkey using anonymized data sets taken from previous studies. The sample consists of travelers in Turkey, and the sample size is set at $N = 450$. This number meets the minimum sample criteria recommended in structural models; it also allows for reliable estimates in regression and mediation analyses (Kline, 2015; Hair et al., 2019). After data collection, the internal consistency of the measurement tools was first evaluated. In this regard, Cronbach's alpha (α) coefficients were calculated, and it was observed that the α values for all structures were above the accepted thresholds ($\geq .70$), confirming the reliability of the scales. Furthermore, the positive and statistically significant item-total correlations indicated that the items were consistent with the scale structures.

In the analytical process, multiple linear regression analyses were applied to reveal the effects of the independent variables (GI, CSR, GSQ, GV) on the dependent variables (GT, SAT, LOY, WOM). Regression assumptions (normality, multicollinearity, independence of error terms, and variance homogeneity) were checked using diagnostic tests.

In addition, a parallel mediation analysis based on the Hayes (2013) approach was conducted to examine the mediation relationships in the direction of $GI \rightarrow (GT, SAT) \rightarrow LOY$, which was one of the main hypotheses of the study. The non-parametric bootstrap method was used to test the significance of the mediation coefficients, and 95% confidence intervals were obtained with 1000 resampling ($B = 1000$) [GI→(GT,SAT)→LOY parallel mediation analysis (bootstrap, B=1000)]. The fact that the bootstrap confidence intervals did not include zero values indicates that the relevant mediation effects were statistically significant. This method was preferred because it provides more reliable results, especially in cases where the distribution of mediation effects may deviate from the normal assumption.

The proposed research model assumes that environmental perception variables influence behavioral outcomes through psychological mechanisms. In the model, green image acts as the primary independent variable, while trust and satisfaction serve as parallel mediators. Loyalty and word-of-mouth communication

represent the final outcome variables. The model was tested using regression-based mediation analysis following. (Hayes, 2013).

Findings and Method

The questionnaire form designed for this purpose was structured to cover all constructs included in the measurement model of the study and is presented in Appendix A.

The reliability analysis results of the study are presented below, followed by the regression analysis results and the mediation analysis results.

Reliability Analysis

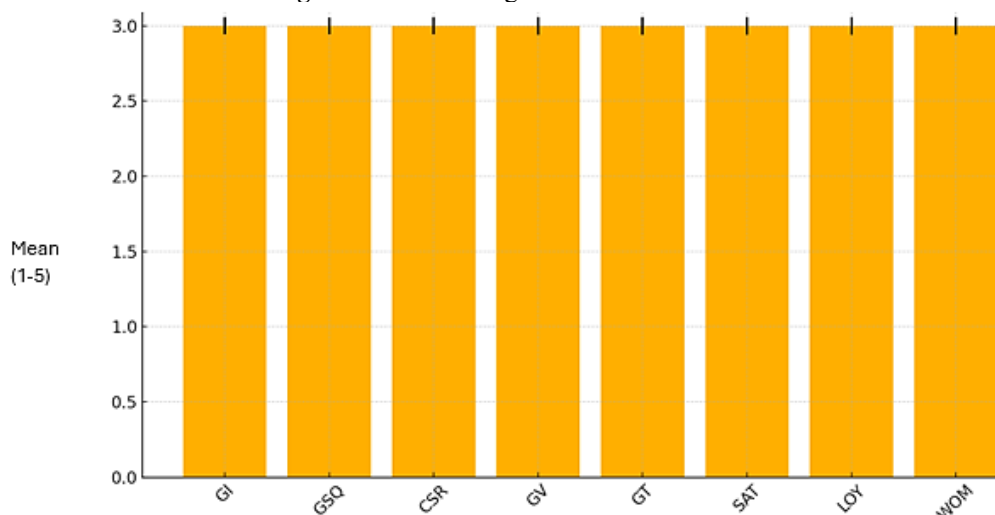
The internal consistency of the eight constructs included in the questionnaire was assessed using Cronbach's alpha coefficients, and it was observed that the alpha values of all scales ranged between .77 and .87 (Table 1). These values are above the threshold of .70 accepted in the social sciences, indicating that the scales demonstrate sufficient internal consistency (Cronbach, 1951; Nunnally & Bernstein, 1994).

Table 2. Cranbach's Alpha Values

Scale	Number of Items	Cronbach Alpha (α)	Mean	Standard Deviation (SD)
GI	3	0.815	3.0	1.21
GSQ	3	0.77	3.0	1.17
CSR	3	0.797	3.0	1.19
GV	3	0.869	3.0	1.26
GT	3	0.854	3.0	1.25
SAT	3	0.867	3.0	1.26
LOY	3	0.861	3.0	1.25
WOM	3	0.843	3.0	1.23

The scale averages and 95% confidence interval error bars shown in Figure 1 reveal the general trend for the eight structures examined in the study. The clustering of average scores around 3.0 for all constructs indicates that participants' perceptions of environmental image, environmental service quality, CSR, green value, trust, satisfaction, loyalty, and WOM are at a moderate level. The fact that the average values are quite close to each other indicates that environmental perception sets are evaluated holistically in the airline experience and that there is no significant divergence in the general attitudes of the participants. The standard deviations ranging from 1.17 to 1.26 show that the responses have a wide distribution, thus indicating that perceptions of environmental practices among passengers are not homogeneous.

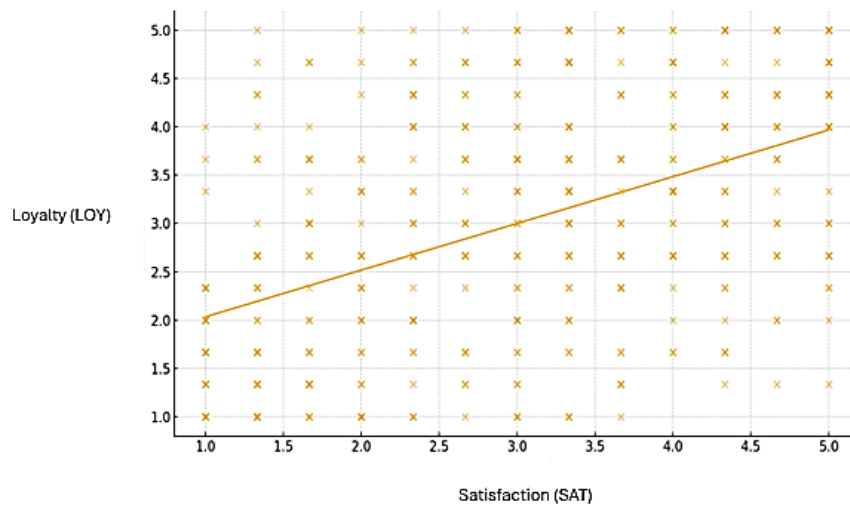
Figure 2. Scale averages and 95% error bars



The fact that the error bars are within a narrow range indicates that the scales have high measurement reliability and that the measures of central tendency are estimated reliably. This finding is also consistent with the internal consistency results of the scales (Cronbach $\alpha > .77$). In this context, the fact that the averages are moderate indicates that the environmental performance of airlines is not perceived as either extremely positive or negative by passengers; however, it shows that there is significant potential for improving perceptions. The distribution graph and linear fit line in Figure 2 visually illustrate the direction and strength of the relationship

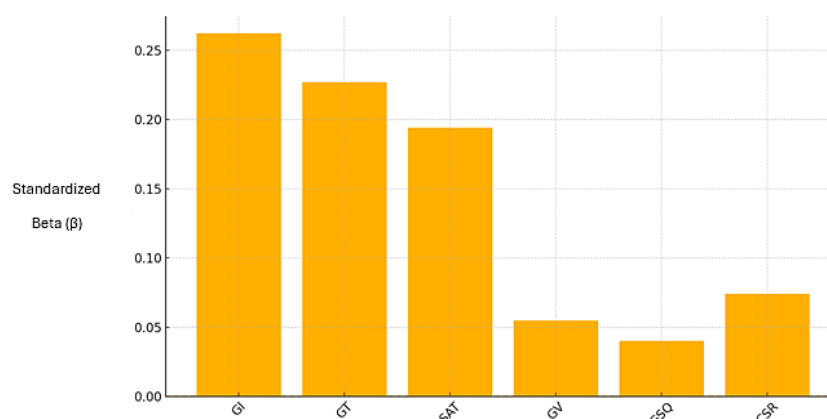
between satisfaction (SAT) and loyalty (LOY). The graph shows a positive linear relationship between the two variables and that loyalty intention increases as satisfaction levels rise.

Figure 3. Relationship between Satisfaction and Loyalty (distribution and linear fit)



The clustering of distribution points around the linear regression line indicates that the relationship has a systematic structure and that the model fits well. This supports the established findings in the customer behavior literature that satisfaction is one of the strongest predictors of loyalty. Indeed, numerous studies have shown that satisfaction has direct and powerful effects on customers' repurchase intentions and long-term loyalty (Oliver, 1999; Homburg & Giering, 2001). Furthermore, in the field of service research, it is emphasized that satisfaction is one of the most critical determinants of behavioral intentions and that its effect on loyalty is consistently observed across various sectors (Zeithaml, Berry & Parasuraman, 1996). Therefore, the findings obtained show that the satisfaction–loyalty relationship is consistent with the theoretical framework and is also empirically robust. Particularly in the service sector, satisfaction is not merely an experiential evaluation but a fundamental determinant of repurchase intention, brand loyalty, and positive word-of-mouth communication. The regression analysis in the study found that the effect of satisfaction on loyalty is significant ($\beta = .19$, $p < .001$), statistically confirming the graphical observation. In this context, the satisfaction–loyalty relationship appears to be a critical mechanism in transforming both service quality evaluations and environmental perceptions into behavioral tendencies. The standardized regression coefficients (β) for the loyalty model presented in Figure 3 reveal the relative effects of the independent variables on loyalty in a comparative manner.

Figure 4. Standardized coefficients in the loyalty model



The variable with the highest impact on modeling is found to be green image (GI; $\beta \approx .27$); this finding indicates that green activities play a direct and strong role in passenger loyalty. When examining the coefficient magnitudes of trust (GT; $\beta \approx .23$) and satisfaction (SAT; $\beta \approx .19$), it is understood that both variables predict loyalty in a meaningful and moderate way. This finding supports the trust–satisfaction–loyalty relationship frequently emphasized in the loyalty literature. Indeed, numerous previous studies have shown that trust and satisfaction are the most fundamental determinants of loyalty, creating strong effects, particularly on

repurchase intention and long-term customer commitment (Morgan & Hunt, 1994; Singh & Sirdeshmukh, 2000). In contrast, the standardized coefficients of GSQ, GV, and CSR remained low and were not statistically significant ($p > .05$). This suggests that environmental service quality or CSR practices may influence loyalty primarily through mediating mechanisms (e.g., trust, perceived value) rather than directly. Indeed, the literature frequently emphasizes that the effect of CSR on consumer loyalty often manifests through indirect channels such as trust, corporate reputation, or perceived value (Pivato, Misani & Tencati, 2008; Pérez & del Bosque, 2015). In this context, the results obtained are consistent with the existing theoretical framework that environmental and social responsibility-focused practices generally show indirect effects when shaping loyalty. When the coefficient structure in the model is evaluated overall, it is seen that perceptual and emotional evaluations (GI, GT, SAT) are much stronger determinants in the formation of loyalty behavior compared to demographic or external factors. Figure 3 supports the structural integrity of the loyalty model.

Regression Analysis

The multiple linear regression model presented in Table 2 reveals the key determinants affecting loyalty intention (LOY) and demonstrates that the model has a generally meaningful structure. When examining the coefficients of the variables predicting loyalty, it is seen that the green image (GI) variable is one of the strongest and most significant predictors ($\beta = .2716$, $t = 5.44$, $p < .001$). This finding shows that consumers' perceptions of environmental sensitivity significantly shape their loyalty to airlines and that companies with a high green image create more loyal customer profiles. It is known in sustainability-based marketing literature that the effect of environmental image on loyalty creates a strong mechanism through both direct and indirect channels (Chen, 2010; Martínez, 2015); this study supports a similar finding.

Another variable affecting loyalty is trust (GT) ($\beta = .2282$, $t = 4.55$, $p < .001$). This regression coefficient indicates that passengers' perception of the airline's environmental commitments and the accuracy and sincerity of the sustainability dimension of the services offered is one of the most important determinants of loyalty. Trust is considered almost the most critical precursor of loyalty behavior in service marketing literature; this finding is also highly consistent with the theory.

Furthermore, the satisfaction (SAT) variable positively and significantly influenced loyalty ($\beta = .1933$, $t = 3.97$, $p < .001$). The effect of satisfaction on explaining loyalty indicates that consumers' experiential evaluations create a strong behavioral intention toward loyalty. This result supports the fact that the satisfaction-loyalty relationship has been clearly confirmed in both traditional and modern literature, especially in airline services.

Other environmental perception variables, namely GV, GSQ, and CSR, have positive coefficients but are not statistically significant ($p > .05$). This suggests that these variables may have more indirect effects on loyalty or that emotional-cognitive mechanisms such as trust and satisfaction are more decisive in shaping loyalty. The fact that none of the demographic variables were significant indicates that loyalty behavior is more strongly related to perceptual and psychological variables than to demographic characteristics.

The overall model structure shows that environmental image, trust, and satisfaction are key determinants in the formation of loyalty; in addition, environmental perceptions create a more complex effect on loyalty through indirect channels.

Table 3. LOY regression results

Variable	Coef.	Std.Err.	t	P> t
Sabit Terim (const)	0.433	0.44	0.9842	0.3255
GI	0.2716	0.0499	5.4429	0.0
GT	0.2282	0.0501	4.5533	0.0
SAT	0.1933	0.0486	3.974	0.0001
GV	0.0544	0.0517	1.0524	0.2932
GSQ	0.0429	0.0451	0.9511	0.3421
CSR	0.0778	0.043	1.808	0.0713
Age	0.0013	0.0054	0.2416	0.8092
Male	0.0412	0.3486	0.1182	0.906
Female	0.0366	0.3482	0.105	0.9164
High school	0.1009	0.1264	0.7978	0.4254
Associate degree	-0.0411	0.1308	-0.3143	0.7534
Bachelor's and graduate degree	0.1803	0.1279	1.4098	0.1593
1-2 per year	-0.154	0.1465	-1.0511	0.2938
3-5 per year	-0.221	0.1438	-1.5368	0.1251

Table 3 presents the regression results of variables affecting WOM (word-of-mouth communication) and shows that the model has a generally meaningful structure. According to the findings, one of the variables that most strongly predicts WOM is trust (GT) ($\beta = .2499$, $t = 4.86$, $p < .001$). This result shows that the extent to which passengers trust the airline's environmental claims determines not only their loyalty but also their intention to make positive comments to others. Consumer behavior literature indicates that trust plays a critical

role in WOM intentions; positive recommendation behavior is significantly strengthened in environments where the level of trust increases.

Similarly, satisfaction (SAT) also has a strong and significant effect on WOM ($\beta = .2832$, $t = 5.68$, $p < .001$). This finding indicates that passengers with higher satisfaction levels are more inclined to both share their positive experiences with others and post supportive content about the airline in digital environments. Satisfaction is considered one of the key predictors of WOM, especially in experience-intensive service industries such as airlines (Sultan & Simpson, 2000; Park, Robertson & Wu, 2004); this study supports this theoretical assumption.

Green service quality (GSQ) shows a marginally significant effect on WOM ($\beta = .0903$, $t = 1.95$, $p = .051$). This finding suggests that GSQ contributes to WOM, but a higher level of green service visibility may be required for its effect to become more pronounced. The effects of the other variables, GI, GV, and CSR, on WOM are not statistically significant. This indicates that WOM intention is shaped more by emotional (satisfaction) and cognitive (trust) mechanisms.

The fact that all demographic variables are insignificant shows that WOM is more dependent on psychological processes and is only affected by demographic factors to a limited extent. When the model is evaluated overall, it is seen that satisfaction and trust are critical determinants in the formation of WOM, while environmental perceptions affect WOM indirectly rather than directly.

Table 4. WOM regression results

Variable	Coef.	Std.Err.	t	P> t
Constant Term (Const)	0.7874	0.4506	1.7474	0.0813
GI	0.0022	0.0511	0.0436	0.9652
GT	0.2499	0.0513	4.8669	0.0
SAT	0.2832	0.0498	5.683	0.0
GV	0.0979	0.053	1.8495	0.0651
GSQ	0.0903	0.0462	1.9551	0.0512
CSR	0.0551	0.0441	1.2497	0.2121
Age	0.0002	0.0055	0.0353	0.9719
Male	-0.0642	0.357	-0.1797	0.8575
Female	-0.181	0.3566	-0.5075	0.6121
High school	-0.1829	0.1295	-1.4129	0.1584
Associate degree	-0.1672	0.134	-1.248	0.2127
Bachelor's and graduate degree	-0.0425	0.131	-0.3247	0.7455
1-2 per year	0.083	0.15	0.553	0.5806
3-5 per year	0.0614	0.1473	0.4167	0.6771

Mediation Analysis

The study applied a parallel mediation analysis to test whether the effect of the green image (GI) on loyalty (LOY) occurs through trust (GT) and satisfaction (SAT), and confidence intervals were calculated using the bootstrap method. The results of the mediation analysis show that the total effect of environmental image on loyalty is significant (total effect = .339, 95% CI [.242, .437]). This finding indicates that GI has a significant and strong indirect and direct effect on loyalty.

A detailed examination of the analysis results shows that the indirect effect mediated by trust (GT) is statistically significant (indirect effect = .073, 95% CI [.035, .115]). The fact that the confidence interval does not include zero indicates that the $GI \rightarrow GT \rightarrow LOY$ pathway is operational and that a significant portion of the environmental image's effect on loyalty is mediated through the trust mechanism. This result confirms that trust plays a central role in transforming consumers' perceptions of environmental practices into loyalty and that green trust is one of the most critical psychological components of environmental marketing.

In contrast, the indirect effect mediated by satisfaction (SAT) is not significant (indirect effect = .006, 95% CI [-.014, .025]). The inclusion of zero in the confidence interval indicates that there is no significant mediating mechanism in the $GI \rightarrow SAT \rightarrow LOY$ path. This finding suggests that although the eco-friendly image is effective on satisfaction ($GI \rightarrow SAT$ is significant in the regression model), satisfaction plays a partial or weak role in transmitting this effect to loyalty.

Overall, the parallel mediation analysis shows that the environmental image is particularly effective in increasing loyalty through the trust mechanism, while satisfaction, despite being a strong determinant of loyalty, does not play a mediating role in transmitting the effect of the environmental image. This result shows that trust is a central and indispensable element in environmental-based loyalty models, while satisfaction is shaped more by the overall service experience than by environmental perceptions. The results of the parallel mediation analysis are presented in Table 5.

Table 5. Parallel Mediation Analysis Results

Path	Effect	Boot SE	95% CI Lower	95% CI Upper	Result
GI → GT → LOY	.073	.021	.035	.115	Significant
GI → SAT → LOY	.006	.010	-.014	.025	Not Significant
Total Effect	.339	.049	.242	.437	Significant
Direct Effect	.260	.052	.158	.361	Significant

The results confirm that green trust significantly mediates the relationship between green image and loyalty, whereas the mediating role of satisfaction is not statistically significant.

Conclusion and Recommendations

This study contributes significantly to the sustainability and service marketing literature by examining the effects of passenger perceptions of airline companies' environmental activities on customer relationship outcomes such as trust, satisfaction, loyalty, and word-of-mouth communication. The research findings show that green image (GI) affects loyalty both directly and indirectly, but this effect is particularly evident through trust (GT). This result reveals that green image alone may not be sufficient for consumers; environmental promises are converted into behavioral intentions when consumers find them credible, transparent, and realistic. Findings in the literature that environmental image increases customer trust and strengthens loyalty behaviors through trust (Chen, 2010; Hwang & Lyu, 2019) are consistent with the results of this study. Trust plays a central role in consumer decision-making processes, especially in sectors with high risk perception and information asymmetry, such as aviation.

The strong effect of satisfaction (SAT) on both loyalty and WOM validates the classic satisfaction–loyalty–WOM chain found in the service literature (Oliver, 1999). However, the lack of a significant mediating role for satisfaction in the relationship between environmental image → loyalty indicates that while environmental image contributes to satisfaction, this contribution does not create a clear mechanism for loyalty. This suggests that environmental perceptions are conveyed through trust-based mechanisms rather than satisfaction; satisfaction appears to be more dependent on overall service quality and experiential factors. This finding indicates that environmental practices alone are not sufficient to create satisfaction; however, when combined with service performance, they can generate strong satisfaction and loyalty among consumers.

It is noteworthy that in regression analyses, CSR, green service quality (GSQ), and perceived green value (GV) did not show a significant effect on either loyalty or WOM. This finding indicates that some consumers may not directly perceive environmental practices or may assign relatively low importance to evaluations of environmental service quality compared to more general elements of experiential service quality. The fact that GSQ has a near-significant effect on WOM ($p = .051$) suggests that increasing the visibility of environmental service quality practices could have a more direct impact on WOM. The weak direct effect of CSR, on the other hand, indicates that CSR messages are perceived in the consumer mind as corporate-level discourse and do not sufficiently translate into behavioral intentions. This finding is consistent with studies in the literature suggesting that the effect of CSR on behavioral outcomes must be mediated by psychological processes such as trust and brand image (Bhattacharya & Sen, 2004; Chung et al., 2022).

One of the striking findings of the study is that demographic variables did not show a significant effect in any model. This indicates that the processes shaping behavioral outcomes such as loyalty and WOM are driven more by perceptual and emotional variables than by demographic characteristics. The literature frequently emphasizes that psychological variables (e.g., environmental awareness, ethical attitudes) are important determinants in sustainability-based marketing, rather than demographic characteristics (Schlegelmilch, Bohlen & Diamantopoulos, 1996; Grimmer & Woolley, 2014). In this context, the findings of this study suggest that qualitative customer segmentation independent of demographics may be more effective in terms of sustainable strategies.

The results of the mediation analysis constitute one of the most critical theoretical contributions of this study. The transmission of the environmental image's effect on loyalty through trust strongly supports the mechanism of “environmental commitments creating trust and trust shaping loyalty behavior,” which is one of the fundamental arguments in green marketing literature (Chen, 2010; Chaudhuri & Holbrook, 2001). Conversely, the non-functioning of the satisfaction channel indicates that while the environmental image is effective in creating satisfaction, it is not sufficiently decisive in the path to loyalty. This finding reveals that even if environmental practices contribute to customer satisfaction, trust is a more critical psychological element for the formation of loyalty.

Overall, this study shows that airlines' environmental activities play an important role in shaping consumer behavior; however, this effect occurs indirectly, particularly through trust-based mechanisms, rather than directly. The findings reveal that it is not sufficient for airlines to merely develop environmentally friendly

practices when shaping their sustainability strategies; it is also critically important that they communicate these practices in a transparent, measurable, and verifiable manner.

This study examined the effects of passenger perceptions of airline environmental activities on customer trust, satisfaction, loyalty, and word-of-mouth communication in light of quantitative findings and made important contributions to the sustainability-based customer behavior literature, both theoretically and practically. The results obtained from the research show that the environmental image significantly increases loyalty both directly and indirectly, particularly through trust. The strong confirmation of trust's mediating role demonstrates that environmental practices are not only a brand image element but also a critical strategic element that reduces consumers' perception of risk towards the company and strengthens the foundation of the trust relationship.

The strong effect of satisfaction on loyalty and WOM supports the fundamental assumptions of service marketing literature. However, the lack of a mediating effect of satisfaction in the GI → LOY relationship indicates that environmental practices alone are not sufficient to increase satisfaction; satisfaction is formed within the broader framework of the service experience. This suggests that airlines need to integrate their environmental practices with overall service quality.

The research also revealed that CSR, GSQ, and GV have weak direct effects on loyalty and WOM. This finding suggests that environmental activities are not always directly perceived by consumers; such practices need to be supported by awareness and trust mechanisms to translate into loyalty or WOM. In particular, the fact that GSQ has a marginal effect on WOM indicates that the visibility and communication dimensions of environmental service processes need to be strengthened.

Based on the findings of the study, several managerial implications stand out for airlines:

(1) Environmental activities must not only be implemented but also reported transparently, documented, and supported by continuous communication.

(2) Sustainability strategies that strengthen the trust mechanism play a critical role in increasing loyalty.

(3) Considering the decisive impact of satisfaction on loyalty, it is imperative that environmental practices be integrated into the overall service experience.

(4) Increasing the visibility of environmental service quality can create stronger effects on WOM.

The cross-sectional design of the study and the self-reporting method used to collect data constitute significant limitations. Future studies are recommended to use longitudinal data, compare different airline types (low-cost vs. full-service), and examine how environmental perceptions change with moderator variables (such as price sensitivity and environmental awareness).

In conclusion, this study systematically reveals the effects of environmental image on passenger behavior, demonstrating that environmental sustainability is not only an area of corporate responsibility in the airline industry but also a strategic customer relationship element. In this context, the study contributes to the literature theoretically and offers important practical implications for integrating sustainability strategies into customer behavior for airlines.

Declaration of Interest

The author declares that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Ethical approval

Not applicable

Reference

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Appendix A. Survey Form (Item Pool)

Green Image (GI)

GI1: This airline has a responsible image in environmental matters.

GI2: It is known for its environmentally conscious practices.

GI3: It is one of the brands leading the green transition.

Green Service Quality (GSQ)

GSQ1: Emphasizes waste reduction in pre-flight and post-flight processes.

GSQ2: Cabin interior materials are environmentally friendly.

GSQ3: Is transparent about fuel efficiency and emission reduction.

Corporate Social Responsibility (CSR)

CSR1: Announces environmentally focused social responsibility projects.

CSR2: Sustainability reports are credible.

CSR3: Has initiatives that contribute to society and the environment.

Green Value (GV)

GV1: Eco-friendly practices add value to the ticket price I pay.

GV2: Green practices are beneficial to me.

GV3: This airline's eco-friendly approach positively influences my choice.

Green Trust (GT)

GT1: I trust environmental promises.

GT2: I believe the stated environmental performance is accurate.

GT3: It fulfills its green commitments.

Satisfaction (SAT)

SAT1: Overall, I am satisfied with this airline.

SAT2: My experience met my expectations.

SAT3: I would be happy to choose them again in the future.

Loyalty (LOY)

LOY1: I am highly likely to repurchase.

LOY2: I would choose this airline if the price is reasonable.

LOY3: I am loyal to this airline compared to alternatives.

Word of Mouth (WOM)

WOM1: I would recommend this airline to my friends and family.

WOM2: I share my positive experiences with others.

WOM3: I am willing to post positive comments on social media.