Green Purchase Intention in the Air Travel Industry: Influence of Environmental Knowledge and Attitude

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Nomenclature

AVE	Average Variance Extracted
F-VIF	Full Variance Inflation Factor
GPB	Green Purchase Behavior
HTMT	Heterotrait-Monotrait Ratio of Correlations
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
PLS-SEM	Partial Least Square Structural Equation Modeling
SAF	Sustainable Aviation Fuel
VAB	Value-Attitude-Behavior

1 Introduction

The air travel industry is currently responsible for 3% of global carbon dioxide (CO_2) emissions and 11% of the total CO_2 emissions from the transport industry. Therefore, the air travel industry is one of the fastest-growing emitters of greenhouse gases (Kharina et al., 2018). Current projections indicate that demand for air travel will surpass 10 billion by 2050, resulting in roughly 21.2 gigatons of CO_2 emissions by that year (IATA, 2022).

There are numerous efforts to curb the increase in CO_2 emissions. The International Civil Aviation Organization (ICAO) focuses on two aspirational targets, including a 2% fleet-wide increase in fuel efficiency by 2050 and zero net growth

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T. H. Karakoc et al. (eds.), *Green Approaches in Sustainable Aviation*, Sustainable Aviation, https://doi.org/10.1007/978-3-031-33118-3_7

in aviation CO_2 emissions through the Fly Net Zero project (Kharina et al., 2018). Multiple action plans, such as sustainable aviation fuel (SAF), adoption of new technologies based on electricity and hydrogen, offsets, and carbon capture, contribute to the aim of zero net growth in CO_2 emissions (IATA, 2022). Furthermore, airlines have also implemented environmentally responsible initiatives to become more eco-friendly. For instance, Delta Air Lines has pledged $1 billion toward carbon neutrality by 2030. Similarly, JetBlue has committed to achieving its goal of being carbon neutral by 2040 and United Airlines by 2050 (Boerner, 2021).

The level of consumer sensitivity and understanding regarding the deterioration of the environment and its impact on social life is growing day by day. This circumstance has given rise to a process in which consumers evaluate their purchase decisions in light of the environment and human health (Varshneya et al., 2017). Therefore, consumers demand environmentally friendly products due to increasing environmental awareness and related concerns (Mohd Suki, 2016). For this reason, it is essential to understand the purchasing behavior of environmentally conscious consumers in the air travel industry, a significant source of CO_2 emissions.

Consumers' environmental knowledge significantly drives their propensity to purchase eco-friendly products (Li et al., 2019). On the other hand, consumers' intention to acquire green products is an indispensable manifestation of their green purchasing behavior. Understanding this aspect is critical for the development of marketing strategies by airlines (Zhuang et al., 2021). In addition, according to the value-attitude-behavior (VAB) model, the mediating role of attitude in the relationship between environmental knowledge and green purchase intention should not be overlooked. Ignoring this point may lead to an underestimation of the influence of environmental knowledge on purchase intention (Li et al., 2019). The purpose of this study is twofold: to examine the effect of environmental knowledge on green purchasing intention in the air travel industry and to examine the mediating effect of green attitude in general on the relationship between environmental knowledge and green purchase intention.

2 Literature Review

2.1 Environmental Knowledge

Environmental knowledge is an individual's comprehension and familiarity with environmental concerns (Mostafa, 2009). Individuals with a particular environmental knowledge are more likely to take pro-environmentalist actions and do not disregard the potential environmental consequences of their actions (Li et al., 2019). Kusuma and Sulhaini (2018) discovered that those with greater environmental knowledge were more likely to purchase eco-friendly products. A similar finding was also found in the meta-analysis conducted by Zhuang et al. (2021). The existing literature also suggests that environmental knowledge positively affects attitudes

toward green products (Rusyani et al., 2021). Thus, we contend, in the context of the air travel industry:

H1: Environmental knowledge positively influences green purchase intention.
H2: Environmental knowledge positively influences green attitude in general.

2.2 Green Attitude

Attitude refers to a settled style of thinking and stable psychological inclination that affects an individual's behavior (Ajzen, 1991). As an individual's favorable attitude toward a particular action grows, so does his or her propensity to engage in that conduct. Attitude is an important explanatory factor in explaining purchasing behavior toward green products (Li et al., 2019). Rusyani et al. (2021) suggested that positive green attitudes significantly predicted the eco-sustainable purchasing behavior of customers because consumers with positive green attitudes feel a part of the global community. Therefore, it would not be surprising if the green attitude affects purchase intention in airline travel. Thus, we anticipate:

H3: Green attitude in general positively influences green purchase intention.

2.3 Green Attitude as a Mediator

The value-attitude-behavior (VAB) model postulates that attitude has a mediating role in the relationship between values and behaviors (Homer & Kahle, 1988). Accordingly, attitudes potentially serve as a mediator between green buying behaviors and various stimuli. Within the Green Purchase Behavior (GPB) model, which is one of the best models for explaining the attitude-behavior relationship for green products, a meta-analysis has revealed that attitude mediates the effect of several antecedents on green purchase intention (Zaremohzzabieh et al., 2021). Thus, the following is hypothesized:

H4: The association between environmental knowledge and green purchase intention is mediated by green attitude.

3 Data and Methodology

Using a quantitative research approach, previously validated scales were used to quantify latent variables in this study. Respondents were asked to rate the items on a 5-point Likert scale ranging from 1 "Strongly Disagree" to 5 "Strongly Agree." The scales were taken from Varshneya et al. (2017) to measure green attitude in general.

The scale of environmental knowledge was borrowed from Mostafa (2009). Finally, the scale employed by Mohd Suki (2016) was used for measuring green purchase intention.

The population taken for this study is airline customers in Turkey. In 2021, Turkey hosted a total of 128,350,222 passengers, including those in transit, making it a prominent country whose civil aviation industry is seeing a significant expansion (DHMI, 2022). Therefore, the current environment is extremely beneficial for the implementation of green aviation principles and best practices. A convenience sampling approach was adopted for data collection (Varshneya et al., 2017).

A web-based questionnaire was created to collect the study data. Hulland et al. (2018) concluded in a literature review study of 202 studies that electronically based surveys are quite common in the marketing field. During the data collection process, 160 participants were surveyed. Four observations revealed a dubious response pattern known as straight-lining but no incomplete responses. After eliminating these four responses, 156 responses remained for analysis.

Kock and Hadaya (2018) recommend that the sample size for partial least squares structural equation modeling (PLS-SEM) analysis should be determined using the inverse square root or gamma exponential approaches. Since there is no expectation for a minimum path coefficient in our study model, the gamma exponential approach deems at least 146 respondents to be sufficient (Kock & Hadaya, 2018).

We used the PLS-SEM approach to analyze the data. PLS-SEM is a connoisseur of explanatory research (Hair et al., 2021) since it is devoted to maximizing the explained variance of latent variables. PLS-SEM can effectively analyze non-normal data and small sample sizes (Mohd Suki, 2016). According to Sarstedt et al. (2020), PLS-SEM can make more conservative analyses than its counterparts as it takes measurement error into account in advanced analyses such as the mediation effect. All estimations in this study were performed with ADANCO v2.3 (Henseler, 2021).

4 Results

In this study, data obtained from a total of 156 respondents were analyzed. There were 94 male respondents (60.3%) and 62 female respondents (39.7%). Regarding the age group, 87 respondents were between the ages of 18 and 25 (55.8%), while 51 respondents were between the ages of 26 and 35 (32.7%). In terms of educational background, it is also observed that the majority of respondents, namely 96 respondents (61.5%), hold a bachelor's degree. Lastly, 102 respondents (65.4%) traveled for leisure.

The PLS-SEM analysis consists of two phases: the measurement model analysis and the structural model analysis (Mohd Suki, 2016). However, in the measurement model, the risk of common method bias was initially examined using the full collinearity (F-VIF) test proposed by Kock (2017) for the PLS-SEM approach. Since the F-VIF values of the research constructs ranged from 1.362 to 1.574 (F-VIF <3.3), the data do not pose a threat of common method bias (Kock, 2017).

Table 1 Reliability and validity analysis

Construct	Items	Loading	Cronbach's alpha	Rho_A	AVE
Environmental knowledge	ENK1	0.851	0.853	0.859	0.631
	ENK2	0.820			
	ENK3	0.824			
	ENK4	0.736			
	ENK5	0.732			
Green attitude in general	ATT1	0.834	0.836	0.843	0.753
	ATT2	0.905			
	ATT3	0.863			
Green purchase intention	PUI1	0.761	0.670	0.725	0.595
	PUI2	0.850			
	PUI3	0.695			

Table 2 Discriminant assessment (HTMT-2)

Construct	ENK	ATT	PUI
ENK	–		
ATT	0.448	–	
PUI	0.652	0.624	–

In the measurement model, the three reflectively measured constructs, namely environmental knowledge, green attitude in general, and green purchase intention, were evaluated using confirmatory factor analysis. As shown in Table 1, Cronbach's α and Dijkstra-Henseler's rho (Rho_A) values of the constructs are above the recommended threshold of 0.70, except for Cronbach's α value of green purchase intention (Hair et al., 2021). However, this value is also at a tolerable level. Therefore, internal consistency was attained. According to Table 1, the average variance extracted (AVE) values of all constructs are larger than the cutoff of 0.50, and factor loadings are higher than a threshold of 0.60. Therefore, convergent validity was established in this study (Mohd Suki, 2016).

To assess discriminant validity, we applied a measure of the heterotrait-monotrait ratio of correlations (HTMT-2) that outperformed its competitors (Roemer et al., 2021). As a conservative benchmark, the HTMT-2 measure should fall below 0.85. As seen in Table 2, HTMT-2 values are much below the cutoff, proving discriminant validity.

Next, the structural model was analyzed the hypothesized relationships. This was accomplished using the percentile bootstrapping technique with 999 subsamples (Henseler, 2021). Table 3 displays the results of the structural model supporting all hypotheses (H1–H4). Accordingly, environmental knowledge positively influences green purchase intention ($\beta = 0.377$, $p < 0.01$) and green attitude in general ($\beta = 0.436$, $p < 0.01$). Hence, H1 and H2 are supported. In a similar vein, green attitude in general exerts a significant positive impact on green purchase intention ($\beta = 0.379$, $p < 0.01$), bringing evidence for H3. Finally, path estimates noted that green attitude mediates the impact of environmental knowledge on green purchase intention ($\beta = 0.165$, $p < 0.01$). Thus, H4 is also maintained. For significant path

Table 3 Hypothesis testing results

Hypothesis	β	t-value	CI (95%)	Cohen's f2	p-value	Support
ENK → PUI	0.407	7.212	[0.293; 0.514]	0.233	0.000	Yes
ENK → ATT	0.392	4.933	[0.224; 0.536]	0.181	0.000	Yes
ATT → PUI	0.349	5.188	[0.217; 0.483]	0.172	0.000	Yes
ENK → ATT → PUI	0.137	3.592	[0.068; 0.217]	NA	0.000	Yes

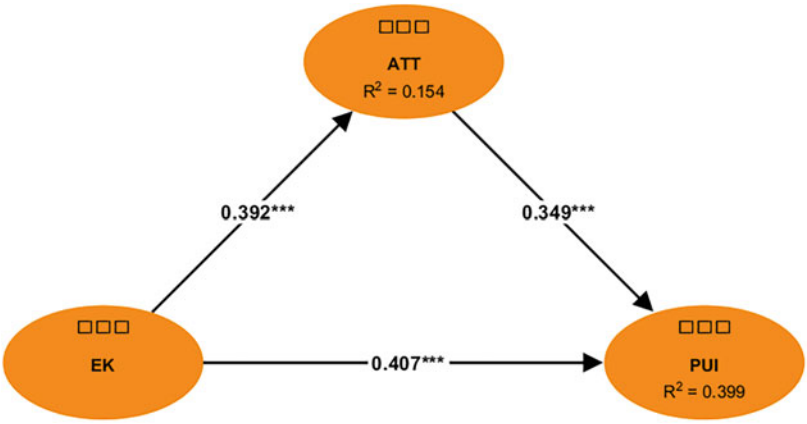

Fig. 1 Results of the structural model

coefficients, effect sizes above 0.02, 0.15, and 0.35 yield small, medium, and large effects, respectively (Hair et al., 2021). According to Table 3, H1-H3 hypotheses with a direct relationship show a medium effect.

For the structural model, we finally examined the in-sample explanatory power (R^2) of endogenous variables (see Fig. 1). Accordingly, the variances explained by green attitude in general and green purchase intention were 15.4% and 39.9%, respectively. Although the practical significance of the R^2 value varies depending on the research context, values above 0.15–0.20 are acceptable in areas such as consumer behavior (Hair et al., 2021). Thus, we may infer that the research model provides sufficient explanatory power.

5 Conclusion

As Sect. 4 delineates, our empirical results reveal significant relationships between environmental knowledge, green attitude in general, and green purchase intention. Moreover, the green attitude in general has a mediating effect in the proposed conceptual model. These findings are consistent with past research (Mohd Suki, 2016; Varshneya et al., 2017; Kusuma & Sulhaini, 2018; Chen et al., 2020; van Tonder et al., 2020). Previous research (Mohd Suki, 2016; Kusuma & Sulhaini,

2018; Li et al., 2019) has corroborated the effect of environmental knowledge on attitude and green purchase intention. In addition, the finding that attitude is also a determinant of green purchase intention is not surprising, as earlier research (Mohd Suki, 2016; Li et al., 2019; Chen et al., 2020) has demonstrated this. Moreover, similar to Li et al. (2019), this study discovered the mediating effect of green attitude on the proposed relationship.

This study has theoretical contributions. First, this study addresses the notion of green purchase intention to contribute to the body of knowledge on sustainable consumerism in the domain of civil aviation. Moreover, to the best of the author's knowledge, the association between environmental knowledge and green purchase intention has not been explored before in the context of the air travel industry. This study reveals that environmental knowledge favorably influences green purchase intention directly or through green attitude in general, thus filling the research gap.

According to the findings, an innovative airline that wants to strengthen passenger purchase intention should be able to communicate its sustainable practices to environmentally conscious customers through communication channels. Moreover, to increase green purchase intention, managers must implement marketing strategies that will reinforce consumer attitudes.

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