FACTORS INFLUENCING AIR TRAVELERS' INTENTION TO PURCHASE VOLUNTARY CARBON OFFSETS

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Factors Influencing Air Travelers' Intention to Purchase Voluntary Carbon Offsets

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DECLARATION OF ORIGINALITY

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ABSTRACT

Factors Influencing Air Travelers' Intention to Purchase Voluntary Carbon Offsets

This study investigates the factors influencing air travelers' intention to purchase voluntary carbon offsets (VCOs) and examines the moderating role of environmental concern. The theoretical foundation is Ajzen's (1991) Theory of Planned Behavior (TPB), which posits that attitude, subjective norms, and perceived behavioral control shape behavioral intentions. To enhance explanatory power, the TPB is extended by incorporating two additional constructs: personal norms (from the Norm Activation Model) and perceived trust in airlines, with environmental concern included as a moderator. Data were collected from 489 Turkish air travelers who had taken at least one flight in the past year. A market research firm employed systematic random sampling from a nationally representative online panel, and the data were analyzed using partial least squares structural equation modeling. Results indicate that all five antecedents—attitude, subjective norms, perceived behavioral control, personal norms, and perceived trust in airlines—positively and significantly influence intention to purchase VCOs. Moderation analysis further reveals that environmental concern strengthens the positive effect of personal norms on purchase intention, while no significant moderating effects emerge for the other antecedents. These findings provide empirical support for the extended TPB model and underscore the importance of both moral obligation and institutional trust in promoting pro-environmental behavior in air travel. Practical implications are offered for airlines and policymakers seeking to enhance engagement with carbon offsetting initiatives.

ÖZET

Havayolu Yolcularının Gönüllü Karbon Dengeleme Satın Alma Niyetini Etkileyen Faktörler

Bu çalışma, havayolu yolcularının gönüllü karbon dengeleme (GKD) programlarını satın alma niyetini etkileyen faktörleri incelemekte ve çevresel kaygının, bu faktörler ile gönüllü karbon dengeleme programlarını satın alma niyeti arasındaki ilişkilerdeki moderatör rolünü araştırmaktadır. Çalışmanın kuramsal temeli, Ajzen'in (1991) Planlanmış Davranış Teorisi'ne (PDT) dayanmaktadır. PDT; tutum, öznel normlar ve algılanan davranışsal kontrolün bireylerin davranış niyetlerini şekillendirdiğini öne sürmektedir. Model, kişisel normlar (Norm Aktivasyon Modeli'nden) ve havayolu şirketlerine duyulan güven değişkenleriyle genişletilmiş; çevresel kaygı ise düzenleyici değişken olarak ele alınmıştır. Veriler, son bir yıl içinde en az bir kez uçuş gerçekleştirmiş 489 Türk yolcudan elde edilmiştir. Veri toplama, ulusal temsiliyet sağlayan çevrimiçi bir panelden, sistematik rastgele örnekleme yöntemi kullanılarak araştırma firması aracılığıyla gerçekleştirilmiştir. Veriler, kısmi en küçük kareler yapısal eşitlik modellemesi ile analiz edilmiştir. Tutum, öznel normlar, algılanan davranışsal kontrol, kişisel normlar ve havayolu şirketlerine duyulan güvenin, GKD satın alma niyeti üzerinde anlamlı ve olumlu etkisi olduğu tespit edilmiştir. Moderatör analizinde, çevresel kaygının sadece kişisel normlar ile satın alma niyeti arasındaki ilişkiyi anlamlı düzeyde güçlendirdiği tespit edilmiştir. Bulgular, kullanılan genişletilmiş PDT modelini desteklemekte ve hava yolu taşımacılığı bağlamında çevre dostu davranışların teşvikinde ahlaki yükümlülükler ile kurumsal güvenin önemini vurgulamaktadır. Sonuçlar, havayolu şirketleri ve

politika yapıcılar için karbon dengeleme programlarına yolcu katılımını artırmaya yönelik pratik öneriler sunmaktadır.

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To improve readability and style, I made limited use of AI-based language-editing tools. These tools were not used for generating content, conducting the literature review, or developing the discussions. All ideas, analyses, and conclusions in this thesis are entirely my own work.

I extend my heartfelt thanks to my family and friends for their steadfast support and encouragement throughout every phase of this research and the writing process. Their collective wisdom and encouragement have been instrumental in shaping not only this thesis but also my academic and personal growth.

I dedicate this thesis to the most special person I have ever known, my mother, Hamide Durmuş, for whom the greatest blessing in my life has been to be your daughter, and to Hande İpek, who represents my hope for the future. I also dedicate this work to all the children of the world, wishing them days filled with safety, prosperity, and happiness.

TABLE OF CONTENTS

CHAPTER 1: INTRODUCTION 1

1.1 Research background 1

1.2 Problem statement 5

CHAPTER 2: LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT ... 8

2.1 Theory of planned behavior 10

2.2 Extending the TBP with personal norms: 16

2.3 Further extending the TBP with perceived trust in airlines: 18

2.4 Moderating role of environmental concern: 20

CHAPTER 3: METHODOLOGY 26

3.1 Measurement 26

3.2 Sample and data collection 27

3.3 Data analysis 29

CHAPTER 4: FINDINGS 30

4.1 Respondent profile 30

4.2 Assessment of outer (measurement) model 34

4.3 Assessment of inner (structural) model 36

4.4 Moderation analysis 39

CHAPTER 5: CONCLUSION 42

5.1 Discussions 42

5.2 Theoretical implications 44

5.3 Practical implications 46

5.4 Limitations and future research 47

APPENDIX A: QUESTIONNAIRE (IN ENGLISH) 50

APPENDIX B: QUESTIONNAIRE (TURKISH) 54
APPENDIX C: THE ETHICS COMMITTEE APPROVAL 58
REFERENCES 59

LIST OF TABLES

Table 1. Demographic Profile of the Respondents (N=489) 30

Table 2. Flight frequency and carbon offsetting knowledge of the respondents 32

Table 3. Carbon Offsetting Behavior of the Respondents (N=489) 33

Table 4. Travel Purpose Preferences and Willingness to Pay for Carbon Offsets (N=489) 33

Table 5. Assessment of the Measurement Model 35

Table 6. Discriminant Validity (HTMT) 36

Table 7. Structural Model Results 39

Table 8. Moderation Analysis Results 40

CHAPTER 1

INTRODUCTION

1.1 Research background

Climate change is an urgent global concern, presenting significant risks to both the environment and human population. This phenomenon is largely driven by greenhouse gas emissions, predominantly from fossil fuel-based energy sources, which contribute to rising global temperatures and increased extreme weather events (Psistaki et al., 2024). Climate change poses significant challenges to the airline industry, which is a major contributor to global carbon emissions. The aviation industry plays a substantial role in this issue because its ongoing expansion contributes to warming through the emission of CO2 and other short-lived pollutants (Gössling & Dolnicar, 2023). The aviation sector accounts for approximately 2-3% of global CO2 emissions, and this figure is projected to increase as air travel demand increases (Lee et al., 2021). This percentage may seem small, but it represents a substantial volume of greenhouse gases released into the atmosphere annually. Moreover, the impact of aviation emissions is amplified owing to their release at high altitudes, where they have a more pronounced effect on the Earth's climate system. (Truong-Dinh et al. 2023).

The aviation sector's impact on climate change highlights the importance of adopting carbon-neutral business practices (Filho et al., 2022). Airlines are actively pursuing strategies to reduce their environmental footprints, such as the integration of Sustainable Aviation Fuels (SAF) to significantly reduce carbon emissions (Filho et al., 2022). Additionally, airlines are exploring technological advancements, including innovative propulsion systems and sustainable aviation fuels, while also

promoting behavioral shifts such as reducing flight frequency and opting for alternative transportation methods (Gössling & Dolnicar, 2023). Alongside these measures, voluntary carbon offsetting (VCO) has emerged as another approach for airlines to address their environmental impact. VCO allows passengers to counterbalance their emissions by investing in environmental projects, such as reforestation or renewable energy initiatives (Gössling et al., 2009; Zhang et al., 2012).

The aviation industry is facing increasing demand to curtail its carbon emissions through a multifaceted approach, encompassing fleet modernization, operational enhancements, and the adoption of sustainable aviation fuels (SAFs). The process of fleet modernization involves the substitution of outdated, less efficient aircraft with contemporary models featuring advanced aerodynamic designs and more economical propulsion systems. Operational enhancements encompass a diverse array of strategies, including flight path optimization, aircraft mass reduction, and the implementation of advanced air traffic control mechanisms. SAFs derived from renewable resources such as organic matter or recycled materials present a promising avenue for mitigating the carbon intensity of aviation fuels. (Schäfer et al., 2019).

Nevertheless, the effectiveness of VCO programs is limited, as passenger engagement is low and the overall emissions offset remains minimal (Gössling et al., 2009). Despite the aviation industry's ongoing efforts to reduce its environmental footprint, there is an urgent need for more extensive and coordinated strategies. This includes a strategic focus on developing sustainable infrastructure across the global airport network (Filho et al., 2022) and incorporating a range of mitigation strategies such as technological innovations, behavioral changes, and carbon offsetting

initiatives (Gössling & Dolnicar, 2023; Zhang et al., 2018). The success of these efforts will be pivotal in achieving transformative adaptation of the aviation sector to address climate change in the post-COVID-19 era.

Despite these efforts, the industry's emissions continue to rise, prompting calls for more stringent regulations and market-based measures, such as carbon pricing and emissions trading schemes (Lu et al., 2018). Carbon pricing mechanisms aim to internalize the environmental costs of aviation by imposing a fee on carbon emissions, thereby incentivizing airlines to reduce their carbon footprints. Emissions trading schemes, such as the European Union's Emissions Trading System (EU ETS), establish a market for carbon allowances and encourage companies to invest in emissions reduction technologies and practices.

The aviation sector serves as a crucial catalyst for global economic growth, while simultaneously ranking as a primary source of global CO2 emissions. In 2019, Chinese air travel generated 103 million tons of CO2, representing 16.54% of the global aviation industry emissions and approximately 10% of the nation's transportation-related carbon output (Zhou, H., Wei, Q., & Guo, Y., 2024).

Voluntary carbon offsets serve as a mechanism for organizations and individuals to mitigate their greenhouse gas emissions by investing in initiatives that reduce or sequester carbon dioxide from the atmosphere (Choi & Ritchie, 2014; Lovell, 2010). These offsets play a crucial role in addressing climate change, particularly in sectors such as aviation where direct emission reductions are challenging (Choi & Ritchie, 2014).

VCO is considered an effective way for individuals to play a role in address climate change (McLennan et al., 2014). Through participation in these programs, passengers in the airline industry contribute to initiatives such as reforestation and

renewable energy projects designed to decrease or eliminate greenhouse gas emissions (Babakhani et al., 2017). However, despite the advantages of VCO programs, their adoption remains low, mainly because of passengers' limited understanding of climate change and how these programs work (Chi et al., 2021). Additionally, existing research on the factors influencing passengers' willingness to purchase VCOs is insufficient, emphasizing the need for further studies in this area, particularly in developing countries, such as Türkiye.

The voluntary carbon offset market experienced rapid expansion, with a 200% increase from 2005 to 2006, and over 150 sellers globally (Lovell et al., 2010). This growth is attributed to factors such as consumer demand, corporate objectives, and the opportunity for cost-effective emissions reductions (Choi & Ritchie, 2014; Lou et al., 2023).

Nevertheless, concerns have been raised regarding the quality and efficacy of these projects, with doubts regarding their actual impacts on climate change (Haya et al., 2023; Trencher et al., 2024). In conclusion, although voluntary carbon offsets can significantly contribute to climate change mitigation, there are numerous challenges to their implementation and management. The rapid growth and evolution of the market necessitates further research and policy development to ensure that these offsets effectively reduce emissions and align with sustainable development goals (Fujii et al., 2024; Mello, 2024; Streck, 2021).

Carbon offsetting initiatives in the airline industry were first introduced by the British Airways in 2005. Subsequently, KLM implemented its CO2 ZERO program, which encouraged travelers to purchase carbon credits to counterbalance the environmental impact of their flights. The Virgin Atlantic followed suit, offering carbon-offset options similar to its clientele. A significant development occurred on

November 12, 2021, when Xiamen Airlines unveiled the first "carbon neutral" airline tickets within China's civil aviation sector. This program requires passengers to remit an additional fee to neutralize their carbon footprint, with proceeds allocated to mangrove restoration projects. (Zhou et al., 2024)

The challenge of decarbonizing the aviation sector is further complicated by the rapid expansion of the industry, particularly in emerging markets. As air travel becomes increasingly accessible to a broader population, the demand for flights is projected to increase substantially in coming decades. This growth trajectory imposes additional pressure on airlines and policymakers to develop innovative solutions that can accommodate rising passenger numbers, while simultaneously reducing overall emissions (Park et al., 2024). Decarbonization efforts in the aviation industry encompass a range of regulatory initiatives. European flights currently operate under the EU Emissions Trading Scheme, while policymakers explore additional measures like mandatory quotas for sustainable aviation fuel. Despite these regulations, existing legislation permits voluntary climate action through corporate carbon offsetting programs. Numerous airlines continue to offer their customers the option to participate in voluntary initiatives on an individual basis. (Berger et al, 2022).

1.2 Problem statement

As the global community strives to meet Paris Agreement targets, the airline sector must accelerate its decarbonization efforts to align with climate goals and ensure long-term sustainability. This will require a multi-faceted approach involving collaboration between airlines, aircraft manufacturers, fuel suppliers, airports, and governments. Investments in research and development of low-carbon technologies,

coupled with supportive policy frameworks, will be crucial in driving the transition to a more sustainable aviation industry.

The imperative to address climate change in the aviation sector is accentuated by potential ramifications of inaction. Elevated sea levels and increased frequency of extreme weather events could potentially disrupt airport operations and flight schedules, whereas alterations in atmospheric conditions may impact aircraft performance and safety. Furthermore, as public awareness of climate change intensifies, airlines may encounter reputational risks and potential consumer opposition if perceived as inadequately addressing their environmental impact. (Brouwer et al., 2008)

Therefore, the airline industry confronts a multifaceted and formidable challenge in pursuing sustainability amidst climate change. Although advancements have been achieved in enhancing efficiency and developing alternative fuel sources, substantial additional efforts are required to align aviation emissions with global climate objectives. The efficacy of these endeavors will be contingent upon continued technological innovation, robust policy support, and a collective commitment from all stakeholders within the aviation ecosystem to prioritize environmental sustainability in conjunction with economic growth.

To summarize, despite the aviation industry's ongoing efforts to lessen its environmental footprint, there is an urgent requirement for more extensive and coordinated strategies. This includes a strategic focus on developing sustainable infrastructure across the global airport network (Filho et al., 2022) and incorporating a range of mitigation strategies such as technological innovations, behavioral changes, and voluntary carbon offsetting initiatives (Gössling & Dolnicar, 2023; Zhang et al., 2018). The success of these efforts will be pivotal in achieving

transformative adaptation of the aviation sector in addressing climate change in the post-COVID-19 era. Among these strategies and practices, voluntary carbon offsetting programs remain underutilized due to low passenger participation. Understanding the behavioral factors that shape air travelers' willingness to purchase VCOs is therefore a critical gap in both research and practice.

Accordingly, this study aims to investigate the factors that influence air travelers' intention to purchase voluntary carbon offset (VCO) programs. Additionally, the study aims to address existing research gaps and advance previous research on tourism in two significant ways: first, by extending the Theory of Planned Framework to include 'personal norms' and 'perceived trust in airlines', and second, by examining the moderating role of environmental concern in the relationships between these factors.

CHAPTER 2

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Over recent years, sustainability research in tourism—and particularly aviation—has gained significant momentum, driven by growing public concern about the environmental impact of air travel (Mair, 2011). Aviation is recognized as one of the fastest-growing contributors to global greenhouse gas (GHG) emissions, accounting for approximately 2–3% of annual global CO_2 and projected to expand further if current trends continue (Gössling & Humpe, 2020). In response, voluntary carbon offsetting (VCO) has emerged as a market-based mechanism that allows passengers to compensate for travel-related emissions by supporting environmental preservation initiatives such as reforestation or renewable energy development (de Mello, 2024). Despite increasing integration of VCO schemes into airline booking systems, participation rates remain extremely low—often below 5%—highlighting a substantial gap between accessibility and actual engagement (Homar & Cvelbar, 2024).

This low uptake has drawn attention to the importance of trust, transparency, and accurate information in shaping travelers' offsetting intentions (Chen, 2013; Park et al., 2024; Deng et al., 2024). In this context, the International Air Transport Association (IATA)—the global trade association representing the world's airlines—has played a key role in establishing credibility and standardization within the industry. Specifically, IATA (2022) introduced a standardized per-passenger CO_2 calculation methodology aligned with the International Civil Aviation Organization's (ICAO) Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA). By providing a transparent, uniform framework for calculating and

reporting flight emissions, IATA seeks to reduce consumer uncertainty, enhance comparability across airlines, and ultimately strengthen travelers' perceived behavioral control and trust in airline-led offsetting programs. This industry-led initiative directly intersects with behavioral theory: by increasing transparency and perceived fairness, it can reinforce key determinants of intention highlighted in the Theory of Planned Behavior (TPB).

Previous research has focused on understanding the psychological and social drivers of VCO engagement. Early studies, such as Lu and Shon (2012), explored individual-level motivations for willingness to pay, yet lacked robust theoretical grounding. Scholars have since increasingly relied on TPB, which posits that attitudes, subjective norms, and perceived behavioral control shape intention formation, as a foundational framework for understanding pro-environmental behavior (Ajzen, 1991; Ajzen, 2020). Within the context of VCO, TPB-based studies show that favorable attitudes toward carbon offsetting significantly predict intention, consistent with broader environmental consumer research (Tao et al., 2021; van der et al., 2021). However, TPB alone often fails to capture the full complexity of offsetting behavior, as moral obligation and trust emerge as crucial, particularly when individual actions contribute to collective environmental benefits (Chen, 2013; Park et al., 2024; Deng et al., 2024).

To enhance theoretical robustness, this study extends TPB by incorporating personal norms derived from Schwartz's (1977) Norm Activation Model and perceived trust in airlines, while simultaneously examining the moderating influence of environmental concern. This integrated model addresses two critical gaps: first, by investigating the psychological and social factors shaping air travelers' intentions to purchase VCOs; and second, by exploring whether environmental concern amplifies

these relationships, consistent with evidence on how moral norms interact with ecological commitment (Wang & Chen, 2022; Lee, 2008). By explicitly linking individual behavioral mechanisms to industry initiatives such as those promoted by IATA, the framework not only synthesizes moral, cognitive, normative, and trust-based constructs, but also situates these constructs within real-world institutional efforts to improve transparency, accountability, and perceived control in carbon offsetting. This alignment between behavioral theory and industry practice provides a more comprehensive, contextually grounded understanding of offsetting intentions in aviation sustainability.

2.1 Theory of planned behavior

The theoretical foundation for this study is grounded in Ajzen's (1991) Theory of Planned Behavior (TPB), a widely recognized framework for predicting and understanding behavioral intentions. The theory of planned behavior, developed by Ajzen (1985, 1987), is an extension of the theory of reasoned action and provides a framework for predicting and explaining human behavior in specific contexts.

The TPB is one of the most widely applied models for predicting pro-environmental behavior. Its utility lies in its parsimonious structure, which captures three psychological constructs—attitude, subjective norms, and perceived behavioral control—that influence an individual's intention to perform a specific action (Ajzen, 1991). In environmental contexts, TPB has been used to explain behaviors ranging from recycling to sustainable tourism choices (Cao, J., Qui, H., & Morrison, A.M. 2023). In the aviation domain, TPB applications have demonstrated that attitudes toward offsetting, social influence, and perceived control significantly predict intentions to purchase VCOs (Tao et al., 2021; Park et al., 2024). Yet, the model's predictive power can be enhanced when moral and trust-based constructs are

incorporated, reflecting the multifaceted nature of sustainability decisions (Chen, 2013; Mello, 2024).

According to this theory, human behavior is guided by three main factors: attitudes toward the behavior, subjective norms, and perceived behavioral control (Ajzen, 1991). Attitudes toward a behavior indicate how positively or negatively an individual assesses that behavior. Subjective norms pertain to the social pressure one feels to either engage in or avoid the behavior. Perceived behavioral control, which sets this theory apart from the theory of reasoned action, involves the perceived ease or difficulty of carrying out the behavior, reflecting both past experiences and expected challenges and barriers. (Ajzen, 1991). The interplay of these three factors shapes an individual's behavioral intentions, which are believed to encapsulate the motivational elements that drive behavior. The theory suggests that, in general, the more positive the attitude and subjective norm, and the higher the perceived behavioral control, the stronger an individual's intention to engage in the behavior is likely to be (Ajzen, 1991).

In conclusion, the Theory of Planned Behavior (TPB) stands as a robust and influential framework for understanding and predicting human behavior across various domains. Its strengths lie in its comprehensive approach, integrating attitudes, subjective norms, and perceived behavioral control to explain intentions and actions. The theory has demonstrated considerable predictive power and has been successfully applied to a wide range of behaviors, from health-related choices to consumer decisions. Moreover, the TPB's focus on underlying beliefs provides valuable insights for designing effective behavioral interventions. However, it is important to acknowledge that while the TPB has received substantial empirical support, there remain unresolved issues, particularly regarding the exact nature of the

relationships between beliefs and the theory's main constructs. Despite these challenges, the TPB's flexibility and openness to incorporation of additional predictors position it as a dynamic and evolving model. As research continues, the TPB is likely to maintain its significance in behavioral science, offering both theoretical depth and practical utility for researchers and practitioners alike (Ajzen, 1991).

2.1.1 Attitude toward carbon offsetting

Attitude refers to an individual's overall evaluation—positive or negative—of engaging in a particular behavior (Ajzen, 1991). VCOs reflect the extent to which a traveler believes that purchasing offsets are beneficial, meaningful, and worth cost. Empirical studies have consistently demonstrated that favorable attitudes toward carbon offsetting are strongly associated with higher purchase intentions. For instance, Tao et al. (2021) found the attitude to be the most influential predictor of Chinese consumers' willingness to buy VCOs, suggesting that affective and cognitive evaluations of offsetting are key motivators. Similarly, Park et al. (2024) reported that passengers with positive perceptions of offsetting environmental benefits expressed a greater readiness to participate in airline programs.

Beyond simple favorability, research has indicated that message framing can shape attitudes. Homar and Cvelbar (2024) showed that highlighting altruistic and collective benefits of offsetting improved participants' moral evaluations of the practice. Conversely, skepticism about the effectiveness or credibility of offsets can erode positive attitudes as consumers may question whether their contribution makes a tangible difference (Wynes et al., 2020). Thus, understanding and fostering positive

attitudes is essential for increasing uptake. Based on this theoretical and empirical foundation, the following hypothesis is proposed:

H1: Attitude toward carbon offsetting has a positive influence on the intention to purchase VCO.

2.1.2 Subjective norms

Subjective norms capture perceived social pressure to perform or avoid a behavior (Ajzen, 1991). In the context of voluntary carbon offsetting, such norms may arise when friends, family, or professional networks endorse or expect carbon mitigation behaviors. Tao et al. (2021) demonstrated that subjective norms significantly influence willingness to purchase offsets, with social influence acting as both a motivator and a form of reinforcement. Park et al. (2024) similarly found that passengers who perceived stronger normative support from significant others were more likely to consider offset purchases.

However, the strength of the normative influence may depend on the visibility and perceived prevalence of the behavior. Wynes et al. (2020) noted that when offsetting is rare or invisible to peers, normative influence is weaker. In contrast, as offsetting becomes more common, social pressure and conformity intensify. This suggests that the industry-wide promotion of VCO participation could indirectly strengthen social norms over time.

This phenomenon aligns with the broader theoretical framework of the Theory of Planned Behavior, where injunctive and descriptive norms are pivotal precursors to behavioral intention (Ajzen, 2020). By internalizing these norms, consumers often convert perceived societal approval into tangible purchasing

intentions, highlighting the crucial impact of social influence in the sustainability sector.

Recent research has also highlighted that the influence of subjective norms is neither static nor universally applicable but is influenced by a range of individual and contextual factors. For example, Lin and Niu (2023) demonstrate that consumers with collectivist cultural orientations show increased sensitivity to normative cues when making environmentally responsible decisions. Similarly, Liu et al. (2024) argue that regulatory focus moderates this relationship, with promotion-focused consumers being more responsive to positive normative signals regarding carbon offsetting. These findings suggest that subjective norms exert a conditional influence, dependent on consumers' cultural backgrounds and motivational states, rather than having a uniform effect across different consumer groups.

Furthermore, the framing of normative appeals has been shown to enhance their persuasive power. Wu and Yang (2024) found that narrative-based messaging, which incorporates social norms into engaging stories, leads to deeper emotional engagement compared to purely informational messages, thereby increasing consumers' intentions to purchase carbon offsets. This finding supports the work of Tao et al. (2021), who advocate for the integration of narrative and social proof strategies to maximize the impact of subjective norms.

Collectively, the literature indicates that subjective norms, when effectively utilized and contextually tailored, can serve as a powerful catalyst for encouraging consumer support for voluntary carbon offset initiatives. This discussion suggests the formation of the second hypothesis as follows:

H2: Subjective norms have a positive influence on the intention to purchase VCOs.

2.1.3 Perceived behavioural control

Perceived behavioral control (PBC) refers to individuals' perceptions of their ability to perform a given behavior, considering both internal resources and external opportunities or constraints (Ajzen, 1991). Tao et al. (2021) found that when individuals perceive themselves as having adequate resources, knowledge, and self-efficacy to engage in carbon offsetting, their likelihood of converting pro-environmental attitudes into actual purchasing intentions significantly increases. This finding is consistent with the Theory of Planned Behavior, which identifies PBC as a crucial precursor to behavioral intention by mitigating perceived barriers and enhancing the perceived feasibility of the behavior (Ajzen, 2020).

Empirical research further validates this association by showing that increased levels of Perceived Behavioral Control (PBC) are consistently linked with stronger intentions to purchase carbon offsets. Ritchie et al. (2020) underscore that travelers who perceive enhanced control over the offsetting process—enabled by accessible information or intuitive purchasing systems—demonstrate a heightened willingness to buy offsets when booking travel. In a similar vein, Choi and Ritchie (2014) reveal that perceived control over financial resources and the complexity of transactions significantly influences consumers' intentions to purchase carbon offsets. Recent studies have broadened these findings by indicating that digital advancements, such as automated offset calculators and transparent certification systems, bolster consumers' sense of control, thereby encouraging a greater propensity to act (Gössling & Shafiei, 2022). Collectively, these findings affirm the role of PBC as both a cognitive and practical facilitator in the decision-making process for purchasing Voluntary Carbon Offsets (VCOs).

Moreover, emerging evidence indicates that interventions aimed at enhancing perceived behavioral control (PBC) can significantly increase consumers' intentions to purchase carbon offsets. For example, Lee et al. (2023) demonstrates that offering clear, actionable information and simplifying purchasing procedures can markedly enhance consumers' perceived ease of engagement, thereby reinforcing their intention to offset emissions. This perspective aligns with Tao et al. (2021), who advocate for the integration of user-centric design and transparent communication to alleviate perceived barriers. Consequently, the literature consistently suggests that perceived behavioral control, when bolstered by structural and informational interventions, positively influences consumers' intention to purchase voluntary carbon offsets (VCOs). Drawing upon this theoretical and empirical foundation, the following hypothesis is proposed:

H3: Perceived behavioral control has a positive influence on the intention to purchase VCOs.

2.2 Extending the TBP with personal norms

The Norm Activation Model (NAM), originally proposed by Schwartz (1977), emphasizes the role of personal moral norms in driving pro-social and pro-environmental behaviors. According to NAM, personal norms—defined as internalized moral obligations—are activated when individuals become aware of the consequences of their actions (awareness of consequences) and attribute responsibility to themselves (ascription of responsibility). This activation process transforms abstract environmental concerns into perceived moral imperatives, which subsequently guide specific behavioral intentions, such as the purchase of voluntary carbon offsets (VCOs). Unlike social norms, which are based on perceived external

expectations, personal norms stem from deeply held ethical convictions, making them particularly effective in motivating voluntary, cost-incurring actions within the sustainability domain.

Empirical research has yielded substantial evidence underscoring the pivotal role of personal norms in influencing consumers' intentions to purchase carbon offsets. In voluntary carbon offsetting, personal norms represent an internalized sense of moral duty to mitigate the environmental harm caused by air travel. Chen (2013) demonstrated that personal norms, coupled with anticipated emotions such as guilt, were strong predictors of airline passengers' participation in carbon offset programs.

Tao et al. (2021) identified that individuals who regard carbon offsetting as a moral obligation demonstrate stronger purchase intentions, independent of perceived social approval or financial considerations. This internalized moral duty effectively bridges the gap between environmental concern and actual consumer behavior. Moreover, Park et al. (2024) illustrate that personal norms exert a more significant influence than subjective norms among consumers with a strong environmental self-identity, indicating that deeply ingrained ethical beliefs can surpass social pressures in the context of pro-environmental consumption.

Recent research has elucidated the mechanisms by which personal norms can be reinforced and translated into definitive intentions. For example, Xu et al. (2023) underscore the significance of environmental messaging that explicitly frames carbon offsetting as a moral obligation, thereby activating latent personal norms and enhancing consumers' propensity to purchase offsets. Similarly, Yoon and Lee (2022) demonstrate that personalized narratives—connecting individual carbon footprints to concrete climate impacts—can amplify the prominence of personal

norms, thereby promoting increased purchase intentions. These findings indicate that although personal norms are inherently internal, external interventions such as moral framing and personalized communication can substantially augment their motivational efficacy.

Recent studies reinforce this finding, showing that personal norms often rival or surpass attitudes in predicting environmental actions (Park et al., 2024; Wagner et al., 2024). In contexts where behavior yields no direct personal benefit, such as offsetting emissions for the collective good, moral obligation becomes a particularly potent driver. This underscores the importance of moral appeal and ethical framing in airline communication. This perspective is consistent with the findings of Tao et al. (2021) and Park et al. (2024), who argue that reinforcing personal norms constitutes a particularly effective strategy for encouraging voluntary carbon offset purchases, particularly among consumers already predisposed to ethical consumption. Drawing upon this theoretical and empirical foundation, the following hypothesis is proposed:

H4: Personal norms have a positive influence on the intention to purchase VCOs.

2.3 Further extending the TBP with perceived trust in airlines

Trust in airlines plays a pivotal role in determining whether passengers believe that offset programs are credible and worth supporting. Perceived trust encompasses the confidence that an airline will allocate funds responsibly, transparently, and effectively (Vlachos et al., 2009). Deng et al. (2024) found that passengers' trust in airlines' environmental commitments significantly increases their willingness to purchase VCOs. Similarly, studies on charitable giving highlight that trust reduces perceived risk and skepticism, and encourages contributions (Sargeant et al.,

2006).When passengers view airlines as transparent, competent, and ethically dedicated to environmental efforts, they are more inclined to convert positive attitudes into actual purchasing decisions. This finding is consistent with the broader literature on trust, which indicates that institutional trust mitigates perceived risk and uncertainty in products and services that require credence (Sargeant et al., 2006).

Recent empirical studies underscore that trust functions through various cognitive and affective pathways. Truong-Dinh et al. (2023) illustrate that perceived trust boosts consumers' confidence in the environmental effectiveness of carbon offset programs, thereby encouraging a greater willingness to participate. Furthermore, Deng et al. (2024) contend that airlines' demonstrated authenticity—evidenced by transparent reporting, third-party certifications, and consistent sustainability communication—strengthens perceived trust, which in turn positively influences consumers' intentions to purchase VCOs. Complementary research by Kim et al. (2023) indicates that trust not only alleviates skepticism about the actual climate impact of offsets but also enhances consumers' emotional commitment to environmental action, highlighting the dual cognitive-affective mechanism underlying the trust–intention relationship.

Conversely, concerns about "greenwashing"—misleading claims about carbon neutrality—can erode trust and suppress participation (Berrin v. Delta Airlines Inc., 2023). This is particularly relevant in aviation, where investigative reports have questioned the legitimacy of offset credits. Building trust requires not only transparent communication, but also demonstrable evidence of impact, such as independent verification and regular reporting on funded projects. Wang and Chen (2022) provide evidence that partnerships with well-regarded environmental NGOs can significantly boost perceived credibility. Additionally, the implementation of

real-time carbon tracking tools is shown to enhance perceptions of transparency and control. In a similar vein, Deng et al. (2024) recommend the use of dynamic storytelling and narratives centered around passengers to make sustainability efforts more relatable and trustworthy. These findings collectively highlight that trust in airlines acts as both a cognitive buffer against uncertainty and an emotional motivator for pro-environmental behavior, ultimately encouraging consumers to purchase voluntary carbon offsets (VCOs). Thus, the following hypothesis was proposed:

H5: Perceived trust in airlines has a positive influence on the intention to purchase VCOs.

2.4 Moderating role of environmental concern

Environmental concerns reflect an individual's awareness of environmental problems, emotional engagement with ecological issues, and personal commitment to solutions (Lee, 2008). Research has consistently shown that individuals with higher environmental concerns are more likely to engage in sustainable behaviors, including paying for VCOs (Onwezen et al., 2013). Park et al. (2024) found that environmental knowledge—closely linked to concern—enhanced the influence of TPB constructs on offset purchase intention. Moreover, environmental concern may moderate the relationships between antecedents (e.g., attitudes, norms, and trust) and intention, strengthening these links for highly concerned individuals (Tao et al., 2021). For example, a passenger with strong environmental concerns may be more responsive to positive attitudes, supportive norms, or high trust in airlines than a passenger with low concern. This suggests that segmenting marketing efforts based on environmental concern levels can improve targeting efficiency.

Grounded in value-belief-norm frameworks and further developed through models such as the Theory of Planned Behavior, environmental concern acts as a motivational enhancer, reinforcing the connection between key antecedents—such as attitudes, norms, and perceived control—and behavioral intentions (Lee, 2008). By increasing the moral and emotional significance of environmental issues, individuals with heightened environmental concern view voluntary carbon offsetting (VCO) not merely as an optional choice, but as a meaningful and necessary action consistent with deeply held ecological values. This increased salience is posited to enhance the predictive power of attitudinal and normative constructs on the intention to purchase VCOs.

Empirical evidence substantiates this moderating effect. Choi et al. (2016) demonstrate that air travelers with heightened environmental concern translate positive attitudes toward carbon offsetting into significantly stronger purchase intentions compared to those with lower concern. Recent studies further this by illustrating that environmental concern also amplifies the influence of subjective norms and perceived behavioral control on intention (Wang et al., 2022). For instance, travelers with environmental concerns are more susceptible to social pressure to offset and experience greater self-efficacy in doing so, thereby enhancing the effect of these antecedents. Additionally, Kim et al. (2023) highlight that environmental concern can more intensely activate personal norms, leading to a stronger moral obligation and, ultimately, a higher intention to purchase VCOs. These findings suggest that environmental concern functions not merely as a direct predictor but as a contextual variable that shapes how cognitive and affective determinants translate into behavioral motivation.

Recent research underscores the moderating role of environmental concern in influencing trust-based determinants of pro-environmental behavior. Deng et al. (2024) contend that perceived trust in airlines significantly impacts the intention to purchase carbon offsets among travelers with heightened environmental concern, as these individuals are more attuned to ethical cues and transparency in corporate sustainability practices. This viewpoint is consistent with recent scholarship, which posits that environmental concern amplifies sensitivity to corporate actions, thereby enhancing the predictive power of trust (Truong-Dinh et al., 2023). These findings indicate that environmental concern systematically enhances the positive effects of attitudes, subjective norms, perceived behavioral control, personal norms, and perceived trust in airlines on the intention to purchase VCOs. Therefore, the following hypothesis and sub-hypotheses were developed:

H6: Environmental concern moderates the relationships between the intention to purchase VCOs and its antecedents:

H6a: The positive effect of attitude toward carbon offsetting on the intention to purchase VCOs is stronger among air travelers with higher environmental concern compared to those with lower environmental concern.

H6b: The positive effect of subjective norms on the intention to purchase VCOs is stronger among air travelers with higher environmental concern compared to those with lower environmental concern.

H6c: The positive effect of perceived behavioral control on the intention to purchase VCOs is stronger among air travelers with higher environmental concern compared to those with lower environmental concern.

H6d: The positive effect of personal norms on the intention to purchase VCOs is stronger among air travelers with higher environmental concern compared to those with lower environmental concern.

H6e: The positive effect of perceived trust in airlines on the intention to purchase VCOs is stronger among air travelers with higher environmental concern compared to those with lower environmental concern.

Figure 1 presents the conceptual model developed in this study, which draws on a substantial body of research to integrate attitudinal, normative, control-based, moral, and trust-related factors in explaining air travelers' intentions to purchase voluntary carbon offsets (VCOs). The theoretical framework is primarily based on the Theory of Planned Behavior (Ajzen, 1991) and the Norm Activation Model (Schwartz, 1977), while also incorporating recent insights into the moderating role of environmental concern (Lee, 2008; Choi et al., 2016). Previous research has consistently indicated that positive attitudes toward carbon offsetting (Tao et al., 2021), the impact of subjective norms (Ritchie et al., 2020), perceived behavioral control (Choi & Ritchie, 2014), and personal moral norms (Park et al., 2024) are significant predictors of consumers' purchase intentions. Additionally, perceived trust in airlines, which is shaped by perceived authenticity and transparency, has become an increasingly important factor in this context (Deng et al., 2024; Truong-Dinh et al., 2023). By synthesizing these elements, the current research aims to capture the intricate and multi-faceted nature of travelers' pro-environmental decision-making.

Expanding on these foundational concepts, this study delves into the moderating influence of environmental concern on the relationships between these antecedents and purchase intention. Empirical findings reveal that travelers with a heightened sense of environmental concern are more inclined to convert positive

attitudes, subjective norms, perceived behavioral control, personal norms, and trust in airlines into a stronger intention to purchase VCOs (Choi et al., 2016; Kim et al., 2023; Wang & Chen, 2022). This moderating effect highlights the increased moral significance and deeper cognitive involvement of environmentally conscious consumers, thereby enhancing the predictive capacity of traditional attitudinal and normative frameworks (Park et al., 2024; Deng et al., 2024). Thus, the proposed model not only accounts for direct effects but also clarifies how variations in environmental concern among individuals shape the transition from psychological antecedents to actual purchase intention.

It is essential to recognize that this research is empirically limited to the context of Turkish airline passengers, which may affect the generalizability of the results. The socio-cultural characteristics, regulatory environment, and market maturity related to carbon offsetting in Türkiye could shape travelers' attitudes, perceived behavioral control, and trust in airlines (Tao et al., 2021; Ritchie et al., 2020). However, by incorporating established theoretical frameworks and recent empirical insights (Choi et al., 2016; Park et al., 2024; Deng et al., 2024), this study endeavors to present a comprehensive conceptual model that clarifies the intention to purchase VCOs among air travelers.

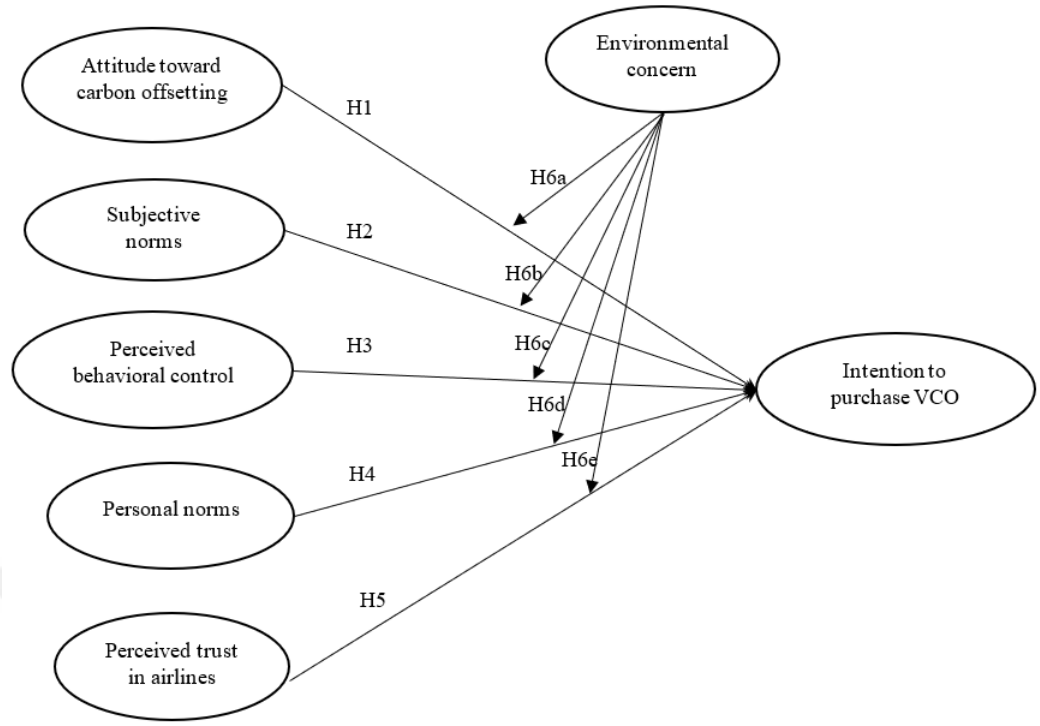


Figure 1. Conceptual model

CHAPTER 3

METHODOLOGY

3.1 Measurement

This study employed a survey research design, with data collected through a structured questionnaire. As illustrated in Figure 1, the research model comprises five exogenous constructs, one endogenous construct, and one moderating variable. The measurement of each construct is detailed below. All measurement items—except one—were adapted from existing literature.

The research model was primarily based on Ajzen's (1991) Theory of Planned Behavior (TPB), a widely used framework for predicting and understanding behavioral intentions. Accordingly, the first three exogenous constructs—attitude toward carbon offsetting, subjective norms, and perceived behavioral control—correspond to the core components of the TPB. *Attitude toward carbon offsetting* was measured using six items adapted from Chen (2013), Tao et al. (2021), and Park et al. (2024). *Subjective norms* were assessed with four items drawn from Pan and Truong (2018), Choi and Ritchie (2014), and Choi et al. (2016). *Perceived behavioral control* was measured using four items—three adapted from previous studies (Tao et al., 2021; Ritchie et al., 2020; Choi & Ritchie, 2014) and one item developed by the researcher.

To extend the TPB framework, two additional exogenous constructs were included in the model. The first of these, *personal norms*, represents the fourth exogenous construct and is derived from the Norm Activation Model (NAM). It was measured using three items adapted from Tao et al. (2021) and Park et al. (2024). The second additional construct, *perceived trust in airlines*, became the fifth

exogenous variable and was assessed using four items adapted from Deng et al. (2024), Sargeant et al. (2006), and Truong-Dinh et al. (2023).

The endogenous construct, *intention to purchase voluntary carbon offsets (VCOs)*, was assessed using three items adapted from Choi et al. (2016). The moderating variable, *environmental concern*, was measured using four items from Lee (2008).

In addition to the study constructs, the questionnaire included items to capture respondents' perceptions of climate change and the perceived climate impact of flying. Perception of climate change was measured using four items from Winter et al. (2021), while the perceived climate impact of flying was measured using three items from Ritchie et al. (2020). All items were measured using 5-point Likert-type scales, ranging from 1 = "Strongly Disagree" to 5 = "Strongly Agree."

The questionnaire also included demographic questions, as well as items on respondents' flight frequency, carbon offsetting knowledge and behavior, travel purpose preferences related to carbon offsetting, and their annual maximum willingness to pay for carbon offsets. The original questionnaire was prepared in English and then translated into Turkish by the researcher, with the approval of her advisor.

3.2 Sample and data collection

The target population of this study consisted of Turkish air travelers who had taken at least one flight within the past 12 months. A screening question was used at the beginning of the survey to ensure eligibility; only respondents who had taken at least one flight within the past year were included in the sample. Data collection was carried out by a market research firm which was contracted for this purpose. The

questionnaires were self-administered by respondents via the online platform managed by the research company. To ensure confidentiality and ethical compliance, participants remained anonymous, and their participation was entirely voluntary. Prior to completing the survey, each respondent was informed about the study's purpose, scope, and confidentiality policies. Using systematic random sampling from a nationally representative online panel of approximately 200,000 individuals in Türkiye, a total of 519 air travelers from 56 different provinces in Türkiye were surveyed. The data collection took palace in February and March 2025. Following data screening procedures, 30 questionnaires were excluded due to low engagement (e.g., selecting the same response for all items). Consequently, the final sample consisted of 489 valid and usable questionnaires.

To determine whether the sample size was statistically adequate, this study followed the guidelines of Ringle et al. (2014) and used G*Power 3 software (Faul et al., 2009) for power analysis. Given that the research model includes six predictors (five exogenous variables and one moderator), the required minimum sample size was calculated as 146 respondents (power = 0.95, $f^2 = 0.15$, $\alpha = 0.05$) (Cohen, 1992). Additionally, Ringle et al. (2014) recommend tripling this minimum required sample size to enhance model stability, which would yield a recommended sample of at least 438 respondents. Based on both the G*Power results and Ringle et al.'s (2014) suggestion, it can be confidently concluded that the final sample of 489 respondents is more than adequate for the purposes of this study.

3.3 Data analysis

Partial least squares structural equation modelling (PLS-SEM) was employed due to the presence of multivariate non-normality in the dataset. To assess the assumption of multivariate normality, Mardia's (1970) multivariate skewness and kurtosis tests were conducted. The results revealed significant deviations from normality, with a skewness z-value of 1037.30 ($p < .001$) and a kurtosis z-value of 38.19 ($p < .001$), indicating a clear violation of the multivariate normality assumption. In such situations, PLS-SEM is considered more suitable, as it does not rely on the assumption of normally distributed data (Usakli & Rasoolimanesh, 2023). Therefore, PLS-SEM was used to analyze the research model.

To address potential concerns related to common method bias (CMB), a full collinearity test was conducted. The results showed that the variance inflation factor (VIF) values for all constructs were below the threshold value of 3.3, as recommended by Kock (2017), suggesting that CMB was not a significant concern in this study.

The PLS-SEM analysis followed a two-step approach. First, the outer (measurement) model was evaluated to establish the reliability and validity of the constructs, including both convergent and discriminant validity. After confirming the adequacy of the measurement model, the inner (structural) model was assessed to test the first five hypotheses. Lastly, to examine the moderating effect of environmental concern on the relationships between intention to purchase voluntary carbon offsets (VCOs) and its antecedents, an interaction moderation analysis was performed.

CHAPTER 4

FINDINGS

4.1 Respondent profile

A total of 489 air passengers from 56 different provinces in Türkiye participated in the study, all of whom had taken at least one flight in the past 12 months. As shown in Table 1, the gender distribution was nearly balanced, with 50.5% as female and 49.1% as male. The average age of respondents was 34.8 years, with a median of 35, indicating a relatively young sample. In terms of education, 62.2% of participants held a university degree, suggesting a generally well-educated sample. Regarding perceived household income relative to the national average, the majority of respondents (62.6%) identified as middle income.

Table 1. Demographic Profile of the Respondents (N=489)

Characteristic	f	%
Gender		
Female	247	50.5
Male	240	49.1
Prefer not to say	2	0.4
Age		
Mean	34.8 years	
Median	35 years	
Level of education		
Less than high school	28	5.7
High school	157	32.1
Associate degree (2-year college)	83	17.0
Bachelor's degree (4-year college)	194	39.7
Masters and/or PhD	27	5.5
Perceived household income *		
Very low	18	3.7
Low	78	16.0
Middle	306	62.6
High	82	16.8
Very high	5	1.0

* Compared to average monthly income in Türkiye.

Table 2 presents the respondents' flight frequency and their self-reported knowledge of carbon offsetting. A majority of participants were relatively infrequent flyers, with 40.9% taking only 1–2 flights per year and 36.6% flying 3–5 times annually. Only a small portion reported flying more frequently, with just 6.3% taking 11–20 flights and 0.8% taking more than 20 flights per year. These figures suggest that the sample largely comprises leisure or occasional travelers rather than frequent flyers.

In terms of knowledge of carbon offsets, 42.9% of respondents indicated that they had no prior knowledge, while 45.6% reported a basic understanding. Only 11.5% of participants stated that they had a clear understanding of carbon offsetting. These findings highlight a general lack of familiarity with carbon offsetting programs among air passengers. To ensure informed responses in the remainder of the survey, all participants were subsequently provided with a brief explanation of voluntary carbon offsetting (VCO) before continuing.

Table 2. Flight frequency and carbon offsetting knowledge of the respondents

Characteristic	f	%
Flight frequency (per year)		
Rarely (1–2 flights)	200	40.9
Occasionally (3–5 flights)	179	36.6
Moderately often (6–10 flights)	75	15.3
Frequently (11–20 flights)	31	6.3
Very frequently (>20 flights)	4	0.8
Knowledge of carbon offsets *		
No knowledge	210	42.9
Basic understanding	223	45.6
Clear understanding	56	11.5

* Following this question, all respondents were provided with an explanation of voluntary carbon offsetting (VCO) before proceeding to the subsequent questions in the survey.

Table 3 shows the respondents' past carbon offsetting behavior. Among the total sample (N = 489), only 27.4% (f = 134) reported having previously purchased carbon offsets, while the majority (72.6%) had never done so. Among those who had offset their emissions, most indicated doing so either "rarely" (32.1%) or "sometimes" (48.5%), suggesting that even among offset users, the behavior tends to be occasional rather than habitual.

Table 3. Carbon Offsetting Behavior of the Respondents (N=489)

Characteristic	f	%
Previous purchase of carbon offsets		
Yes	134	27.4
No	355	72.6
Frequency of offsetting*		
Rarely (e.g., once every few years)	43	32.1
Sometimes (e.g., for some flights)	65	48.5
Often (e.g., for most flights)	22	16.4
Always (for all flights)	4	3.0

* Among those who have offset (n = 134)

Table 4 summarizes respondents' preferred travel context for purchasing voluntary carbon offsets (VCOs) and their maximum annual willingness to pay for voluntary carbon offsetting. When asked in which travel context they would be more likely to purchase VCOs, the majority (69.9%) reported vacation by air, while 30.1% preferred business trip by air. This suggests that leisure-related air travel may offer a more favorable context for promoting carbon offsetting behavior. In terms of willingness to pay, respondents reported an average annual maximum of 62.60 USD for VCOs.

Table 4. Travel Purpose Preferences and Willingness to Pay for Carbon Offsets (N=489)

Characteristic	f	%
Preferred travel purpose for voluntary carbon offsets		
Business trip by air	147	30.1
Vacation by air	342	69.9
Annual maximum amount willing to pay for VCOs (in USD)		
Mean	62.60 USD	

4.2 Assessment of outer (measurement) model

In the first stage of PLS-SEM analysis, the outer (measurement) model was examined to evaluate the reliability and validity of the constructs. The seven constructs used in this study are as follows: attitude toward carbon offsetting (ATT_CO), subjective norms (SN), perceived behavior control (PBC), personal norms (PN), perceived trust in airlines (TRU_AIR), environmental concern (ENV_CON), and intention to purchase voluntary carbon offsetting (INT_VCO).

Given that all seven constructs were reflectively measured, the outer model was evaluated in accordance with established guidelines for reflective measurement models. Four key criteria were assessed: indicator reliability, internal consistency reliability, convergent validity, and discriminant validity (Usakli & Küçükergin, 2018; Usakli & Rasoolimanesh, 2023).

The results of the measurement model assessment are presented in Table 5. Only one item was removed due to the low item loading (< 0.50). All other items exceeded 0.70, thereby confirming indicator reliability (Hair et al., 2019). The internal consistency was assessed using both Cronbach's alpha and composite reliability (CR). Cronbach's alpha coefficients (ranged from 0.796 to 0.931) and composite reliability estimates (ranged from 0.803 to 0.931) all exceeded the recommended thresholds, indicating that all constructs had strong reliability. The Cronbach's alpha values ranged from 0.796 to 0.931 and the composite reliability scores ranged from 0.803 to 0.931, indicating that all constructs had strong internal consistency. Furthermore, average variance extracted (AVE) scores were examined to test the convergent validity. Since all AVE scores were well above the suggested threshold of 0.50 (Fornell & Larcker, 1981), convergent validity was established.

Table 5. Assessment of the Measurement Model

Construct / Associated Items	Loading	α	CR	AVE
Attitude toward carbon offsetting (ATT_CO)		0.902	0.907	0.671
Carbon offsetting can effectively reduce carbon emissions.	0.810			
Carbon offsetting is beneficial in improving the environment.	0.815			
Carbon offsetting is valuable.	0.817			
I'm quite interested in carbon offsetting.	0.769			
Purchasing carbon offset programs makes me feel proud.	0.840			
I have a positive view of purchasing carbon offset programs.	0.859			
Subjective norms (SN)		0.916	0.919	0.799
My family/friends/colleagues think it is a good idea to purchase carbon offset programs.	0.851			
Most people who are important to me would think that I should pay for voluntary carbon offsets.	0.911			
Most people who are close to me would themselves pay for voluntary offsets of their flights.	0.896			
Most people who are close to me would prefer that I pay for voluntary carbon offsets for my flights.	0.916			
Perceived behavioral control (PBC)		0.796	0.803	0.710
I find it easy to purchase carbon offsetting programs during flight booking.	0.796			
I have the necessary resources (e.g., time, money) to purchase carbon offsets.	0.856			
I am confident that if I want, I can pay for voluntary carbon offsets for my flights.	0.874			
The decision to pay for voluntary carbon offsets for my flights is beyond my control. *	-			
Personal norms (PN)		0.816	0.821	0.732
I feel I have a moral obligation to reduce the environmental impact of my air travel.	0.873			
Purchasing carbon offset programs aligns with my personal principles of environmental protection.	0.883			
I would feel guilty if I chose not to purchase carbon offsetting when traveling by air.	0.808			
Perceived trust in airlines (TRU_AIR)		0.920	0.921	0.806
I trust airlines that include a carbon offset charge to genuinely support environmental causes.	0.889			
I trust that airlines will use the funds from carbon offsets responsibly.	0.905			
I trust that airlines charging for carbon offsets would not take advantage of their donors.	0.896			
I trust airlines to use appropriate and considerate methods for fundraising through carbon offsets.	0.901			
Environmental concern (ENV_CON)		0.842	0.854	0.677
I am worried about the worsening of the quality of environment.	0.765			
Environment is a major concern for me.	0.832			
I am passionate about environmental protection issues.	0.845			
I often think about how the condition of the environment can be improved.	0.846			
Intention to purchase voluntary carbon offsetting (INT_VCO)		0.931	0.931	0.879
I intend to purchase voluntary carbon offsets for my air travel in the near future.	0.942			
I will make an effort to purchase voluntary carbon offsets for my air travel in the near future.	0.936			
I plan to purchase voluntary carbon offsets for my air travel in the near future.	0.935			

Notes: * Item is removed due to low factor loading (<0.5)
All item loadings are significant at $p<0.001$
α: Cronbach's alpha, CR: Composite reliability (rho_a); AVE: Average variance extracted

Discriminant validity was assessed using the heterotrait-monotrait (HTMT) ratio of correlations (Henseler et al.,2015). Table 6 shows the results of the HTMT analysis. Two cut offs are recommended for the HTMT analysis (i.e., ≤ 0.85 and ≤ 0.90), where ≤ 0.85 represents a more conservative threshold. As shown in Table 6, all HTMT correlations fell below the more conservative threshold of $HTMT_{0.85}$ while only one HTMT correlation was below the $HTMT_{0.90}$ criterion. Furthermore, the 95% bias-corrected $HTMT_{inference}$ confidence intervals did not include 1 on any constructs (Henseler et al., 2015). These findings ensure that discriminant validity was achieved.

Table 6. Discriminant Validity (HTMT)

Constructs	ATT_CO	SN	PBC	PN	TRU_AIR	ENV_CO	INT_VCO
ATT_CO							
SN	0.666						
PBC	0.639	0.740					
PN	0.817	0.832	0.768				
TRU_AIR	0.543	0.682	0.656	0.778			
ENV_CO	0.591	0.464	0.607	0.662	0.420		
INT_VCO	0.691	0.729	0.724	0.878	0.683	0.589	

ATT_CO: Attitude toward carbon offsetting, SN: Subjective norms, PBC: Perceived behavioral control, PN: Personal norms, TRU_AIR: Perceived trust in airlines, ENV_CON: Environmental concern, INT_VCO: Intention to purchase voluntary carbon offsetting

4.3 Assessment of inner (structural) model

Having established the reliability and validity of the study constructs, the inner (structural) model was evaluated as the second stage of the PLS-SEM analysis. Key assessment criteria included checks for collinearity, explained variance (R^2), the

significance of path coefficients, effect sizes, and out-of-sample predictive performance (Usakli & Küçükergin, 2018; Usakli & Rasoolimanesh, 2023).

A bootstrapping procedure with 5,000 subsamples was employed when assessing the inner model. The results are summarized in Figure 2 and Table 7.

First, multicollinearity was assessed by examining variance inflation factors (VIFs). According to Hair et al. (2019), VIF values should remain below 5—ideally under 3.3. It was found that VIFs ranged from 2.130 to 3.477, indicating no multicollinearity issues. Next, the explained variance (R^2) of the endogenous construct (i.e., INT_VCO) was evaluated. Although acceptable R^2 thresholds depends on the area of research, the guidelines of Henseler et al. (2009) were followed, who suggest 0.75 as substantial, 0.50 as moderate, and 0.25 as weak. Figure 2 shows that R^2 value of *intention to purchase voluntary carbon offsetting* was 0.666, indicating moderate explanatory power. Furthermore, PLS predict was applied to assess the out-of-sample predictive performance of the structural model. The Q^2predict value was found to be 0.641, suggesting strong predictive performance.

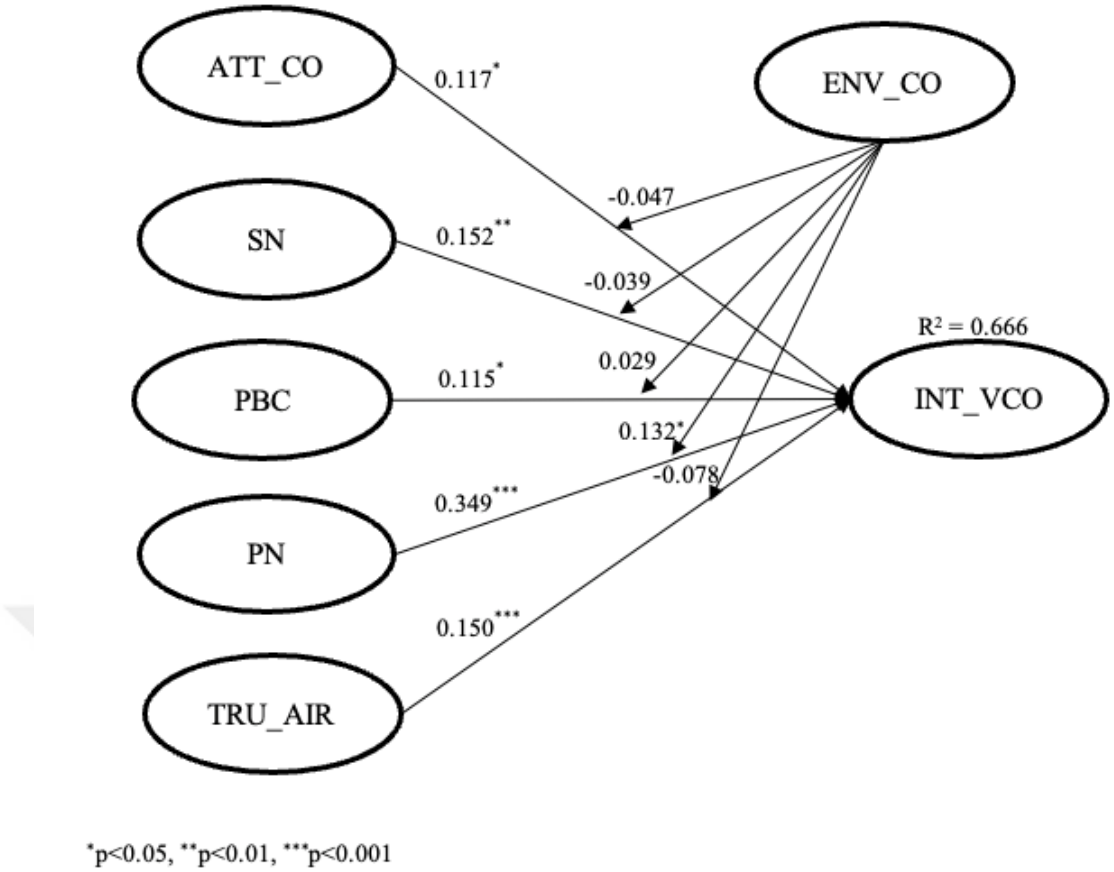


Figure 2. Structural model

Table 7 shows the significance of path coefficients for the first five hypotheses, along with bias-corrected confidence intervals (Bc-CIs) to assess the stability of the path coefficients. Hypothesis 1 through Hypothesis 3 predict that the three constructs derived from the Theory of Planned Behavior positively affect intention to purchase voluntary carbon offsets. The results confirm these predictions, with ATT_CO (β = 0.117, t = 2.317), SN (β = 0.152, t = 2.996), and PBC (β = 0.115, t = 2.391) all exerting positive, significant effects; hence, H1, H2, and H3 are supported.

Hypothesis 4 posits a positive effect of personal norms on intention to purchase voluntary carbon offsets. It was found that PN (β = 0.349, t = 5.745) positively influences INT_VCO. Thus, H4 is supported. Finally, H5 proposes that perceived trust in airlines positively influences intention to purchase voluntary

carbon offsets. The results indicate that TRU_AIR (β = 0.150, t = 3.350) has a significant and positive impact on INT_VCO. Therefore, H5 is also supported.

Table 7. Structural Model Results

Hypothesis	β	95% Bc CI	t	Supported	VIF	f^2
H1: ATT_CO → INT_VCO	0.117	[0.019, 0.218]	2.317*	Yes	2.287	0.018
H2: SN → INT_VCO	0.152	[0.053, 0.252]	2.996**	Yes	2.576	0.027
H3: PBC → INT_VCO	0.115	[0.024, 0.208]	2.391*	Yes	2.063	0.019
H4: PN → INT_VCO	0.349	[0.233, 0.470]	5.745***	Yes	3.477	0.105
H5: TRU_AIR → INT_VCO	0.150	[0.066, 0.241]	3.350***	Yes	2.130	0.032

Notes: *p<0.05, **p<0.01, ***p<0.001 Confidence intervals are bias corrected.
ATT_CO: Attitude toward carbon offsetting, SN: Subjective norms, PBC: Perceived behavioral control, PN: Personal norms, TRU_AIR: Perceived trust in airlines, INT_VCO: Intention to purchase voluntary carbon offsetting

4.4 Moderation analysis

Hypotheses H6a through H6e deal with the moderating role of environmental concern (ENV_CO) on the relationships between the intention to purchase voluntary carbon offsets (INT_VCO) and its five antecedents. Because environmental concern is a continuous variable measured by five items, an interaction moderation analysis was performed. The results are presented in Table 8. As shown in Table 8, it was found that ENV_CO significantly moderates only the effect of PN on INT_VCO. No moderating effect of ENV_CO was found for the other relationships. Therefore, H6a, H6b, H6c, and H6e are not supported.

Table 8. Moderation Analysis Results

	Effect	β	95% Bc CI	*t*	Supported
H6a	ENV_CO × ATT_CO → INT_VCO	-0.047	[-0.125, 0.033]	1.164	No
H6b	ENV_CO × SN → INT_VCO	-0.039	[-0.124, 0.052]	0.889	No
H6c	ENV_CO × PBC→ INT_VCO	0.029	[-0.060, 0.109]	0.681	No
H6d	ENV_CO × PN → INT_VCO	0.132	[0.019, 0.249]	2.234*	Yes
H6e	ENV_CO × TRU_AIR → INT_VCO	-0.078	[-0.179, 0.018]	1.536	No

Notes: *p<0.05 Confidence intervals are bias corrected.
ATT_CO: Attitude toward carbon offsetting, SN: Subjective norms, PBC: Perceived behavioral control, PN: Personal norms, TRU_AIR: Perceived trust in airlines, ENV_CON: Environmental concern, INT_VCO: Intention to purchase voluntary carbon offsetting

To interpret the significant interaction, a simple slope analysis was conducted to understand the moderating role of environmental concern on the relationship between personal norms and intention to purchase VCOs. As depicted in Figure 3, the positive effect of PN on INT_VCO is stronger at higher levels of ENV_CO compared to the lower levels of ENV_CO. That is, as the ENV_CO increases, the impact of PN on INT_VCO increases as well. Thus, H6d is supported.

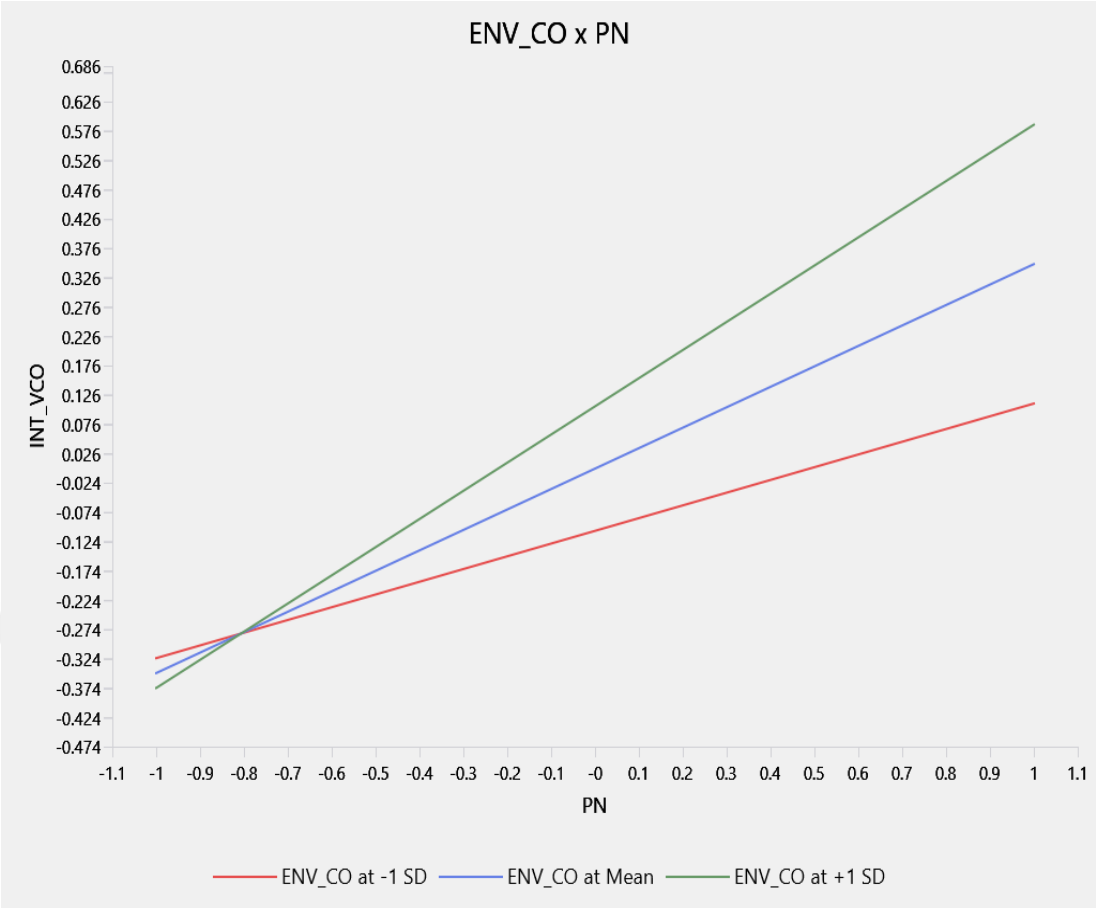


Figure 3. Simple slope analysis (H6d)

CHAPTER 5

CONCLUSION

5.1 Discussions

This study examined the determinants of air travelers' intention to purchase voluntary carbon offsets (VCOs) using the Theory of Planned Behavior (TPB) as its theoretical foundation and extending it with personal norms and perceived trust in airlines. The results provide empirical support for the applicability of TPB in the aviation sustainability context while also demonstrating the added value of moral and trust-based constructs.

Consistent with H1, attitude toward carbon offsetting was found to positively influence intention to purchase. This result aligns with previous studies which emphasized that passengers who hold favorable evaluations of carbon offsetting are more inclined to purchase offsets (Tao et al., 2021; Park et al., 2024). This finding supports the TPB proposition that favorable attitudes increase behavioral intention (Ajzen, 1991) and highlights the importance of shaping positive perceptions of offsetting as a meaningful climate action.

The influence of subjective norms was also confirmed, providing support for H2. This outcome is consistent with Tao et al. (2021) and Park et al. (2024), who found that normative pressure from significant others increases passengers' willingness to engage in offsetting. It suggests that when travelers perceive social approval or expectation, they are more likely to develop stronger intentions to purchase VCOs. This is in line with the TPB framework, which positions social pressure as a key determinant of intention.

Perceived behavioral control was another significant factor, confirming H3. This finding is also consistent with prior studies (Tao et al., 2021; Park et al., 2024), which similarly showed that passengers who perceive offsetting as accessible and manageable are more likely to intend to purchase offsets. This result emphasizes the importance of integrating offsetting options seamlessly into booking systems and ensuring transparency in the process, thereby reducing barriers and enhancing perceived control.

A particularly noteworthy finding relates to personal norms, where results provided strong support for H4. This is consistent with Chen (2013), who found that moral obligation was a central determinant of offsetting participation, and with Park et al. (2024), who reported that personal norms strongly influence purchase intention. The present study reinforces the argument that pro-environmental behaviors such as offsetting are often motivated less by self-interest and more by an internalized sense of moral responsibility.

The study also provides empirical evidence for the role of perceived trust in airlines, supporting H5. This is consistent with Deng et al. (2024) and Park et al. (2024), who found that trust in the responsible use of offset contributions enhances travelers' willingness to purchase VCOs. Trust reduces skepticism and perceptions of greenwashing, making it a decisive factor in passengers' decision-making. These results echo Chen's (2013) argument that credibility and transparency are essential in contexts where consumer contributions fund collective goods.

Finally, the moderating role of environmental concern was only partially supported. While H6d received support—indicating that environmental concern strengthened the effect of personal norms on purchase intention—other hypothesized moderations (H6a, H6b, H6c, H6e) were not supported. This outcome diverges

somewhat from Tao et al. (2021) and Park et al. (2024), who found that environmental knowledge or concern enhanced the predictive power of attitudes and norms. The findings here suggest that environmental concern may not consistently amplify all antecedent relationships; rather, its moderating role appears particularly salient in reinforcing the moral obligation associated with personal norms. This nuance contributes to the literature by showing that environmental concern may not function as a universal moderator but instead exerts selective influence in specific pathways.

Overall, the results demonstrate that the TPB framework is well-suited to explaining voluntary carbon offsetting intentions, with extended constructs—personal norms and perceived trust in airlines—adding significant explanatory value. The partially significant findings on the moderating role of environmental concern highlight the importance of contextual factors and open new avenues for further research on how individual-level concern interacts with normative and trust-related mechanisms in aviation sustainability.

5.2 Theoretical implications

This study offers several theoretical contributions to the growing body of literature on pro-environmental behavior and voluntary carbon offsetting. First, by applying and extending the Theory of Planned Behavior (TPB) (Ajzen, 1991), the findings confirm the model's applicability in explaining air travelers' intention to purchase VCOs. The significant effects of attitude (H1), subjective norms (H2), and perceived behavioral control (H3) are consistent with earlier applications of TPB in environmental and travel-related contexts (Tao et al., 2021; Park et al., 2024). This

reinforces the robustness of TPB as a theoretical lens for understanding consumer behavior in sustainability domains.

Second, the integration of personal norms (H4) from the Norm Activation Model (NAM) (Schwartz, 1977) into the TPB framework strengthens the theoretical argument that moral obligations are crucial in predicting behaviors that yield collective rather than individual benefits. In line with Chen (2013) and Park et al. (2024), this study highlights the centrality of moral responsibility in carbon offsetting decisions, extending TPB by acknowledging the ethical dimension of pro-environmental behavior.

Third, by incorporating perceived trust (H5), this research responds to recent calls to examine credibility and institutional trust in sustainability contexts (Deng et al., 2024; Vlachos et al., 2009). The results demonstrate that trust is not only relevant in charitable giving or CSR contexts but also a critical determinant in carbon offsetting, where skepticism and greenwashing concerns can otherwise undermine consumer engagement.

Finally, the study advances theoretical understanding of environmental concern as a moderating factor (Lee, 2008). While only H6d was supported—indicating that environmental concern strengthens the link between personal norms and intention to purchase—this selective effect refines prior assumptions that environmental concern uniformly moderates all predictors (Tao et al., 2021; Park et al., 2024). By showing that its influence is particularly salient in reinforcing moral obligations, the study contributes to a more nuanced theoretical perspective on how individual concern interacts with attitudinal, normative, and trust-based determinants in the aviation context.

5.3 Practical implications

The findings also generate several practical insights for airlines, policymakers, and stakeholders promoting voluntary carbon offset programs. First, the confirmation of attitude (H1) as a strong predictor underscores the importance of shaping positive passenger perceptions of offsetting. Airlines should emphasize the tangible environmental benefits of offsets and frame them as meaningful contributions to climate action. Communication strategies that highlight co-benefits—such as biodiversity protection or community development—may further enhance attitudes (Homar & Cvelbar, 2024). In addition, our survey revealed that 42.9% of respondents reported having little or no knowledge of carbon offsets. This finding indicates that one of the most fundamental contributions airlines can make is to raise awareness. Providing clear, accessible information about what carbon offsets are, how they work, and their environmental impact can form the basis for all subsequent interventions targeting attitudes, norms, and behavioral control.

Second, the role of subjective norms (H2) suggests that leveraging social influence can be a powerful tool to encourage offset purchases. Airlines could design campaigns that showcase social approval for offsetting, such as highlighting the number of passengers who choose offsets or offering recognition badges for environmentally responsible travelers. Social proof and peer influence strategies have been shown to enhance adoption in other green behavior contexts (Tao et al., 2021).

Third, the effect of perceived behavioral control (H3) emphasizes the importance of convenience and accessibility. Airlines should integrate offsetting seamlessly into the booking process, ensuring that cost, time, and informational barriers are minimized. Simple user interfaces, default offset options, and transparent

explanations of projects can increase passengers' sense of control and likelihood of participation (Mello, 2024).

Fourth, the central role of personal norms (H4) indicates that offsetting should be framed not only as an economic transaction but also as a moral responsibility. Campaigns that appeal to travelers' sense of duty to mitigate their flight emissions may resonate strongly, particularly among those already environmentally engaged. For example, messaging that emphasizes the ethical obligation of frequent flyers could strengthen personal norm activation (Chen, 2013; Park et al., 2024).

Finally, the importance of perceived trust (H5) highlights the need for transparency and credibility. Airlines should provide clear reporting on how offset contributions are used, ideally verified by independent third parties. Building credibility through recognized certification standards can reduce skepticism and foster passenger trust (Deng et al., 2024). At the same time, the selective moderation effect of environmental concern (H6d) suggests that communication strategies may need to be tailored: while highly concerned passengers are more likely to act on moral norms, other groups may require trust-building and convenience-focused interventions to stimulate engagement.

5.4 Limitations and future research

While this study provides valuable insights into the determinants of air travelers' intention to purchase voluntary carbon offsets (VCOs), several limitations should be acknowledged. First, the research was conducted exclusively in Türkiye, a developing country where the concept of carbon offsetting remains relatively novel. Although similar studies have been conducted especially in Europe (North Europe

mainly) and Asia (e.g., Tao et al., 2021; Park et al., 2024), the cultural, social, and economic context of Türkiye may influence the generalizability of the findings. As such, caution should be exercised in extrapolating results to other regions with different levels of environmental awareness, institutional trust, or socioeconomic conditions.

Second, the study relied on self-reported survey data, which may be subject to social desirability bias or overstatement of pro-environmental intentions (Podsakoff et al., 2003). While structural equation modeling provided robust insights into the hypothesized relationships, behavioral intentions do not always translate into actual behavior. Future research should consider incorporating behavioral data, such as actual offset purchases, to validate and extend the current findings.

Third, the study adopted a cross-sectional design, which limits the ability to infer causality. Longitudinal research would be valuable to examine how attitudes, norms, trust, and environmental concern evolve over time, particularly as public discourse on climate change intensifies and airlines adjust their sustainability strategies. In addition, this study focused primarily on environmental concern as a moderator. While this provides novel insights, other psychological variables—such as environmental knowledge (Park et al., 2024), ecological worldview (Dunlap et al., 2000), or climate skepticism (Wynes et al., 2020)—may also interact with TPB constructs to shape offsetting behavior.

Future research should therefore pursue several avenues. Comparative studies across developed and developing countries could illuminate cultural and contextual differences in offsetting behavior. Qualitative research approaches, such as interviews or focus groups, may also yield richer insights into travelers' underlying motivations, barriers, and perceptions of trust. Finally, experimental studies testing

the effects of communication strategies (e.g., message framing, default options, certification cues) on offset purchase behavior could provide practical recommendations for airlines seeking to increase passenger participation in VCO programs. By addressing these limitations, future research can build a more comprehensive understanding of the psychological and contextual drivers of voluntary carbon offsetting in the aviation industry.

APPENDIX A

QUESTIONNAIRE (IN ENGLISH)

Screening question

Have you taken a flight in the past 12 months?

_____Yes _____No

Note: If "No" is selected, the questionnaire will end here.

Questions about the flight experience and the carbon offsetting knowledge and experience

How often do you fly per year?

_____Rarely (1–2 flights per year)

_____Occasionally (3–5 flights per year)

_____Moderately often (6–10 flights per year)

_____Frequently (11–20 flights per year)

_____Very frequently (More than 20 flights per year)

How would you describe your knowledge of carbon offsets?

_____I do not know what carbon offsets are.

_____I have a basic understanding of what carbon offsets are.

_____I clearly understand what carbon offsets are.

Note: After the above question, the following information will be provided to the respondents.

Voluntary Carbon Offsetting (VCO) in the Airline Industry

Voluntary Carbon Offsetting (VCO) refers to the practice of compensating for the carbon dioxide (CO_2) emissions generated by your flight by paying to support environmental projects that reduce or capture greenhouse gases, such as reforestation, renewable energy initiatives, or carbon capture projects. These programs are voluntary and enable air travelers to take responsibility for their environmental impact by contributing financially to efforts that help mitigate climate change.

Have you ever offset a flight?

_____Yes _____No

How often do you purchase carbon offsets for your flights?

_____Rarely (e.g., once every few years)

_____Sometimes (e.g., for some flights)

_____Often (e.g., for most flights)

_____Always (for all flights)

Note: This question will be asked only to respondents who selected 'Yes' for the previous question.

For which of the following travel purposes would you prefer most to purchase a voluntary carbon offset program?

_____Business trip by air _____Vacation by air

What is the maximum amount (in US dollars) you would be willing to pay to offset the carbon emissions generated by a flight? Please write in USD: ……

Please rate your level of agreement with the following statements using the scale below, where '1' indicates 'strongly disagree' and '5' indicates 'strongly agree'.

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1	2	3	4	5

Attitude toward carbon offsetting

1. Carbon offsetting can effectively reduce carbon emissions.
2. Carbon offsetting is beneficial in improving the environment.
3. Carbon offsetting is valuable.
4. I'm quite interested in carbon offsetting.
5. Purchasing carbon offset programs makes me feel proud.
6. I have a positive view of purchasing carbon offset programs.

Subjective norms

1. My family/friends/colleagues think it is a good idea to purchase carbon offset programs.
2. Most people who are important to me would think that I should pay for voluntary carbon offsets.
3. Most people who are close to me would themselves pay for voluntary offsets of their flights.
4. Most people who are close to me would prefer that I pay for voluntary carbon offsets for my flights.

Perceived behavioral control

1. I find it easy to purchase carbon offsetting programs during flight booking.
2. I have the necessary resources (e.g., time, money) to purchase carbon offsets.
3. I am confident that if I want, I can pay for voluntary carbon offsets for my flights.
4. The decision to pay for voluntary carbon offsets for my flights is beyond my control.

Personal norms

1. I feel I have a moral obligation to reduce the environmental impact of my air travel.
2. Purchasing carbon offset programs aligns with my personal principles of environmental protection.
3. I would feel guilty if I chose not to purchase carbon offsetting when traveling by air.

Perceived trust in airlines

1. I trust airlines that include a carbon offset charge to genuinely support environmental causes.
2. I trust that airlines will use the funds from carbon offsets responsibly.
3. I trust that airlines charging for carbon offsets would not take advantage of their donors.
4. I trust airlines to use appropriate and considerate methods for fundraising through carbon offsets.

Environmental concern

1. I am worried about the worsening of the quality of environment.
2. Environment is a major concern for me.
3. I am passionate about environmental protection issues.
4. I often think about how the condition of the environment can be improved.

Intention to purchase voluntary carbon offsetting

1. I intend to purchase voluntary carbon offsets for my air travel in the near future.
2. I will make an effort to purchase voluntary carbon offsets for my air travel in the near future.
3. I plan to purchase voluntary carbon offsets for my air travel in the near future.

Additional questions about the climate change and climate impact of flying

Please rate your level of agreement with the following statements using the scale below, where '1' indicates 'strongly disagree' and '5' indicates 'strongly agree'.

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1	2	3	4	5

Perception of climate change

1. I have already noticed some signs of global warming.
2. It seems to me that temperature is warmer now than in years before.
3. It seems to me that weather patterns have changed compared to when I was a child.
4. I am quite sure that global warming is occurring now.

Perceived climate impact of flying

1. My flights contribute to climate change.
2. Air travel has a harmful effect on our environment.
3. Air travel causes a lot of carbon emissions.

Demographic questions

Your gender: _____Female _____Male _____Non-binary

Your age: …….

What is the highest level of education you have completed?

_____Less than high school

_____High school diploma

_____Associate degree (2-year college)

_____Bachelor's degree (4-year college)

_____Master's degree

_____Doctoral degree

How would you describe your monthly income compared to the average income in Türkiye?

_____Very high _____High _____Middle _____Low _____Very low

What is your current employment status?

_____Full-time

_____Part-time

_____Student

_____Retired

_____Unemployed

_____Other (please specify): _____

APPENDIX B

QUESTIONNAIRE (TURKISH)

Tarama sorusu

Son 12 ay içinde hiç uçuş yaptınız mı?

_____Evet _____Hayır

Not: "Hayır" seçilirse, anket burada sona erecektir.

Uçuş deneyimi ile karbon dengeleme bilgisi ve deneyimi ile ilgili sorular

Yılda ne sıklıkla uçuyorsunuz?

_____Nadiren (Yılda 1-2 uçuş)

_____Ara sıra (Yılda 3-5 uçuş)

_____Orta sıklıkta (Yılda 6-10 uçuş)

_____Sık sık (Yılda 11-20 uçuş)

_____Çok sık (Yılda 20'den fazla uçuş)

Karbon dengeleme hakkında bilginizi nasıl tanımlarsınız?

_____Karbon dengelemenin ne olduğunu bilmiyorum.

_____Karbon dengelemenin ne olduğuna dair temel bir anlayışım var.

_____Karbon dengelemenin ne olduğunu net bir şekilde anlıyorum.

Not: Yukarıdaki sorudan sonra, katılımcılara aşağıdaki bilgi sunulacaktır.

Havacılık Sektöründe Gönüllü Karbon Dengeleme

Gönüllü Karbon Dengeleme *(Voluntary Carbon Offsetting)*, uçuşunuzdan kaynaklanan karbondioksit (CO_2) emisyonlarını telafi etmek amacıyla ağaçlandırma, yenilenebilir enerji girişimleri veya karbon yakalama projeleri gibi sera gazlarını azaltan çevresel projeleri desteklemek için ödeme yaptığınız uygulamaları/programları ifade eder. Bu programlar gönüllülük esasına dayanır ve hava yolu yolcularının, iklim değişikliğini hafifletmeye yardımcı olan çabalara parasal katkıda bulunarak çevresel etkileri konusunda sorumluluk almalarını sağlar.

Şimdiye kadar gerçekleştirdiğiniz uçuşlarınızı düşündüğünüzde, hiç gönüllü karbon dengeleme yaptınız mı?

_____Evet _____Hayır

Uçuşlarınız için ne sıklıkla karbon dengelemesi satın alıyorsunuz?

_____Nadiren (örneğin, birkaç yılda bir)

_____Bazen (örneğin, bazı uçuşlar için)

_____Sık sık (örneğin, çoğu uçuş için)

_____Her zaman (tüm uçuşlar için)

Not: Bu soru yalnızca bir önceki soruda "Evet" seçeneğini işaretleyen katılımcılara sorulacaktır.

Aşağıdaki seyahat amaçlarından hangisi için gönüllü karbon dengeleme programı satın almayı tercih edersiniz?

_____Hava yolu ile iş seyahati _____Hava yolu ile tatil amaçlı seyahat

Bir uçuştan kaynaklanan karbon emisyonlarını dengelemek için ödemeye razı olacağınız maksimum miktar (ABD doları cinsinden) nedir? Lütfen ABD Doları cinsinden yazınız: ……

Lütfen aşağıdaki ifadelerle ilgili katılım düzeyinizi, '1' "kesinlikle katılmıyorum" ve '5' "kesinlikle katılıyorum" anlamına gelecek şekilde derecelendiriniz.

Kesinlikle katılmıyorum	Katılmıyorum	Ne katılıyorum ne katılmıyorum	Katılıyorum	Kesinlikle Katılıyorum
1	2	3	4	5

Karbon Dengelemeye Yönelik Tutum

1. Karbon dengeleme, karbon emisyonlarını etkili bir şekilde azaltabilir.
2. Karbon dengeleme, çevrenin iyileştirilmesinde faydalıdır.
3. Karbon dengeleme değerlidir.
4. Karbon dengeleme ile oldukça ilgileniyorum.
5. Karbon dengeleme programları satın almak, bana gurur verir.
6. Karbon dengeleme programları satın alma konusunda olumlu bir görüşe sahibim.

Öznel Normlar

1. Ailem/arkadaşlarım/meslektaşlarım karbon dengeleme programları satın almanın iyi bir fikir olduğunu düşünüyor.
2. Benim için önemli olan çoğu insan, gönüllü karbon dengeleme için ödeme yapmam gerektiğini düşünür.
3. Bana yakın olan çoğu insan, kendi uçuşları için gönüllü karbon dengeleme ödemesi yapar.
4. Bana yakın olan çoğu insan, uçuşlarım için gönüllü karbon dengeleme ödemesi yapmamı tercih eder.

Algılanan Davranış Kontrolü

1. Uçuş rezervasyonu sırasında karbon dengeleme programları satın almanın kolay olduğunu düşünüyorum.
2. Karbon dengeleme satın almak için gerekli kaynaklara (örneğin, zaman, para) sahibim.
3. İstersem uçuşlarım için gönüllü karbon dengeleme ödemesi yapabileceğimden eminim.
4. Uçuşlarım için gönüllü karbon dengeleme ödemesi yapma kararı benim kontrolüm dışındadır.

Kişisel Normlar

1. Havayolu seyahatimin çevresel etkisini azaltma konusunda ahlaki bir sorumluluğum olduğunu hissediyorum.
2. Karbon dengeleme programları satın almak, çevreyi koruma konusundaki kişisel ilkelerimle uyumludur.

3. Havayolu ile seyahat ederken karbon dengeleme satın almayı tercih etmezsem, kendimi suçlu hissederim.

Havayolu Şirketlerine Duyulan Güven

1. Çevresel amaçları desteklemek için karbon dengeleme ücreti dahil eden havayollarına güveniyorum.
2. Havayolu şirketlerinin karbon dengeleme gelirlerini, sorumlu bir şekilde kullanacaklarına güveniyorum.
3. Karbon dengeleme için ücret talep eden havayolu şirketlerinin, bağışçılarını suistimal etmeyeceğine güveniyorum.
4. Havayolu şirketlerinin karbon dengeleme yoluyla bağış toplamak için uygun ve düşünceli yöntemler kullanacağına güveniyorum.

Çevresel Duyarlılık

1. Çevre kalitesinin kötüleşmesi konusunda endişeliyim.
2. Çevre, benim için önemli bir endişe kaynağıdır.
3. Çevre koruma konularında tutkuluyumdur.
4. Çevre koşullarının nasıl iyileştirilebileceğini sık sık düşünürüm.

Gönüllü Karbon Dengeleme Satın Alma Niyeti

1. Yakın gelecekte havayolu seyahatim için gönüllü karbon dengeleme satın alma niyetindeyim.
2. Yakın gelecekte havayolu seyahatim için gönüllü karbon dengeleme satın almak için çaba göstereceğim.
3. Yakın gelecekte havayolu seyahatim için gönüllü karbon dengeleme satın almayı planlıyorum.

İklim Değişikliği ve Uçuşların İklim Üzerindeki Etkisi ile İlgili İlave Sorular

Lütfen aşağıdaki ifadelerle ilgili katılım düzeyinizi, '1' "kesinlikle katılmıyorum" ve '5' "kesinlikle katılıyorum" anlamına gelecek şekilde derecelendiriniz.

Kesinlikle katılmıyorum	Katılmıyorum	Ne katılıyorum ne katılmıyorum	Katılıyorum	Kesinlikle Katılıyorum
1	2	3	4	5

İklim Değişikliği Algısı

1. Küresel ısınmanın bazı belirtilerini şimdiden fark ediyorum.
2. Bana öyle geliyor ki, hava sıcaklığı önceki yıllara göre daha yüksek.
3. Bana öyle geliyor ki, hava durumu benim çocukluk dönemime kıyasla değişti.
4. Küresel ısınmanın şu anda gerçekleşmekte olduğundan oldukça eminim.

Uçuşların İklim Üzerindeki Algılanan Etkisi

1. Uçuşlarım, iklim değişikliğine katkıda bulunuyor.
2. Havayolu seyahati, çevre üzerinde zararlı bir etkiye sahiptir.
3. Havayolu seyahati, çok fazla karbon emisyonuna neden oluyor.

Demografik sorular

Cinsiyetiniz: _____Kadın _____Erkek _____Non-binary

Yaşınız: …….

Eğitim durumunuz?

_____İlköğretim mezunu

_____Lise mezunu

_____Ön lisans (2 yıllık üniversite)

_____Lisans (4 yıllık üniversite)

_____Yüksek lisans

_____Doktora

Aylık gelirinizi, Türkiye'deki ortalama gelirle kıyasladığınızda nasıl tanımlarsınız?

_____Çok yüksek _____Yüksek _____Orta _____Düşük _____Çok düşük

Mevcut çalışma durumunuz nedir?

_____Tam zamanlı çalışan

_____Yarı zamanlı çalışan

_____Öğrenci

_____Emekli

_____İşsiz

_____Diğer (lütfen belirtiniz): _____

APPENDIX C

THE ETHICS COMMITTEE APPROVAL

T.C.
BOĞAZİÇİ ÜNİVERSİTESİ REKTÖRLÜĞÜ
Sosyal ve Beşeri Bilimler İnsan Araştırmaları Etik Kurulu (Sbinarek)

Sayı : E-84391427-050.04-219460 04.02.2025
Konu : 2025-06T Kayıt Numaralı Başvurunuz Hakkında

Sayın Doç. Dr. Ahmet UŞAKLI

Tez danışmanlığını yürüttüğünüz öğrenciniz Hande Durmuş'un "Factors influencing air travelers' intention to purchase voluntary carbon offsets" başlıklı projesi ile Boğaziçi Üniversitesi Sosyal ve Beşeri Bilimler İnsan Araştırmaları Etik Kurulu (SBİNAREK)'e yaptığınız 2025-06T kayıt numaralı başvuru 17.01.2025 tarih ve 2025/01 sayılı kurul toplantısında incelenmiş ve projeye etik onay verilmesi uygun bulunmuştur.

Bu karar tüm üyelerin toplantıya on-line olarak katılımıyla ve oybirliği ile alınmıştır. Onay mektubu tüm üyeler adına Komisyon Başkanı tarafından e-imzalanmıştır. Bilgilerinizi rica ederiz.

Saygılarımızla,

Dr. Öğr. Üyesi Işıl ERDUYAN
Kurul Başkanı

Bu belge, güvenli elektronik imza ile imzalanmıştır.
Belge Doğrulama Kodu : 0B9Z-UGK5-0H1L Belge Doğrulama Adresi : https://www.turkiye.gov.tr/bogazici-universitesi-ebys

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