

# From attitudes to green vehicle usage intention: the role of felt obligation

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## Abstract

**Purpose** – Due to escalating environmental pollution in Vietnam, green vehicles are rapidly gaining attraction as a green vehicle solution. Applying the theory of planned behavior (TPB), this study aims to explore the role of felt obligation in linking consumer attitudes to green vehicle usage intention.

**Design/methodology/approach** – Data from 408 participants of quantitative research were collected and analyzed with SPSS 26.0 and AMOS 26.0.

**Findings** – Findings reveal that although a positive attitude towards eco-social benefits is associated with green vehicle usage intention, attitude towards environmental issues (AEI) does not directly influence green vehicle usage intention.

**Practical implications** – These results offer strategic insights for promoting green vehicle and suggest directions for future research.

**Originality/value** – This study confirms the application of TPB in predicting green vehicle usage intention from different dimensions of attitudes. Importantly, felt obligation is found to be a full mediator between AEI and green vehicle usage intention as well as a moderator in the relationship between attitude towards eco-social benefits and green vehicle usage intentions.

**Keywords** Green vehicle usage intention, Attitude towards eco-social benefits, Felt obligation, Attitude towards environment issues

**Paper type** Research article

## 1. Introduction

The deterioration of air quality has emerged as a critical global concern, primarily originating from motorized transportation activities. Scientific investigations consistently reveal that these vehicles continuously emit such pollutants as particulate matter, volatile organic compounds, nitrogen oxides, and numerous other contaminants (EPA, 2024). According to the International Energy Agency (IEA, 2021), the transportation sector plays a pivotal role in carbon dioxide emissions. The year 2021 witnessed an alarming statistic, with transportation contributing nearly one-quarter of global energy-related emissions, with the highest concentration observed in urban environments (United Nations Environment Programme UNEP, 2024).

In Vietnam, the situation is even more pressing. Environmental experts argue that road transportation currently accounts for approximately 25% of the nation's total greenhouse gas emissions (Phuong An, 2023). Notably, in urban centers, vehicle emissions are considered the primary pollution source, increasing toxic gas and particulate concentrations to up to 70% of environmental releases (Binh, 2022). Thus, the ultimate objective is to protect living environments by encouraging people to use green vehicles, which necessitates collaborative efforts from communities, enterprises, and policy makers.

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According to the [United States Department of Energy \(2010\)](#), green vehicles refer to road vehicles that have a lesser negative impact on the environment compared to those powered by internal combustion engines running on gasoline, diesel, or certain alternative fuels. The range of green vehicles is quite diverse, including hybrid electric vehicles, plug-in hybrid vehicles, battery electric vehicles, compressed natural gas vehicles, hydrogen and fuel cell vehicles, vehicles powered by pure ethanol, flexible-fuel vehicles, natural gas vehicles, and clean diesel vehicles. Additionally, there are vehicles that operate on blends of biodiesel, ethanol, or gasoline. Research by [Oliver and Lee \(2010\)](#) confirms that these vehicles are not only more environmentally friendly but also incorporate advanced technologies, although their initial investment costs tend to be higher compared to traditional transportation vehicles.

Within the domain of green vehicle research, scholars have adopted multifaceted approaches. [Yong et al. \(2017\)](#) in Malaysia demonstrated correlations between environmental attitudes, perceived behavioral control, and subjective norms with electric vehicle purchase intentions. Conversely, [Mohiuddin et al. \(2018\)](#) presented contradictory findings, failing to confirm the influence of subjective norms. In Vietnam, research has explored factors influencing green vehicle usage. [Thuong and Hieu \(2023\)](#) concentrated on financial barriers, and [Van Tuan et al. \(2022\)](#) analyzed government support roles, while [Thuan et al. \(2023\)](#) discussed price perceptions. However, existing green vehicles research predominantly focuses on electric vehicles, while alternative solutions such as hydrogen vehicles, biofuel technologies, and electric public transportation systems remain underexplored. Therefore, the present research aims to provide a comprehensive perspective on both private and public green vehicles usage, contributing to the development of policy frameworks and green vehicle infrastructure in Vietnam.

This research expands the TPB to deepen the understanding of mediating and moderating roles of felt obligation in the association between different dimensions of attitudes and green vehicle usage intention. This study focuses on the relationships between two dimensions of attitudes: attitudes towards environmental issues, attitudes towards eco-social benefits of using green vehicles, felt obligation, and green vehicle usage intentions. By conducting a comprehensive examination of these psychological and social dynamics, we aim to highlight critical factors influencing sustainable consumption behaviors. Through examining the underlying mechanisms of behavioral intention, this research will suggest strategies in product development, brand positioning, and communication initiatives for businesses to promote green vehicle usage.

## 2. Literature review and hypothesis development

Although the theory of planned behavior (TPB) has provided a relatively high explanatory power for behavioral intentions ([Ajzen, 1991](#)), it has been indicated that extending the TPB to offer a more comprehensive perspective for predicting behavior is a common practice ([Perugini and Bagozzi, 2001](#)). [Ajzen \(1991\)](#) suggested that, besides core constructs of the TPB, moral obligations a type of moral norms, are also likely to shape behavioral intentions. Moral obligations have been shown to demonstrate a predictive power in forming behavioral intentions ([Ogiemwonyi and Jan, 2023](#); [Alam et al., 2023](#); [Eunike et al., 2025](#)). In this study, we aim at adding felt obligation, a moral norm, into the TPB model as a mediator and moderator. Furthermore, instead of revisiting the predictive power of attitudes towards the behavior and behavioral intention, this study aims at adding another dimension of attitudes to the original TPB model. Thus, two types of attitudes added to the research framework include: attitude towards environmental issues (AEI) and attitude towards eco-social benefits of using green vehicles.

[Dadwal et al. \(2020\)](#) argue that usage intention develops when individuals express their perceptions, emotions, and actual behaviors related to the purchase and use of a product or service. This intention to use (UI) a product encourages customers to engage in shopping, complete transactions, and finalize purchases. According to [Yoo et al. \(2000\)](#), usage intention

is defined as a consumer's propensity or desire to purchase a specific product or service. In our study, we approach usage intention by integrating both the intention behind choosing to use personal green vehicles and public transport options.

### 2.1 Felt obligation and green vehicle usage intention

Felt obligation refers to an individual's decision to engage in a specific behavior, based on the belief that it is the right and appropriate action to take (López-Mosquera and Sánchez, 2012; Vilas and Sabucedo, 2012). Felt obligation establishes a foundation for individuals to align their consumption behaviors with ethical norms when making consumption decisions, thereby orienting choices towards products beneficial to sustainable development (Barbarossa and De Pelsmacker, 2016). Felt obligation is defined as an individual's perception of moral responsibility to undertake socially beneficial actions, motivating them to support and assist others (Schwartz, 1977). Based on the TPB model, besides the external social norms, felt obligation is operationalized as a type of internalized feelings, which could be potential predictors of behavioral intention (Gorsuch and Ortberg, 1983; Manstead, 1999).

Felt obligation significantly impacts individuals' environmental protection behaviors (Bamberg and Möser, 2007). When people feel personally responsible for environmental protection, they tend to transform this sense of responsibility into concrete actions, including selecting environmentally non-harmful products or utilizing green vehicles. Research has also acknowledged the positive relationship between felt obligation and green behavioral intentions (Truelove *et al.*, 2014; Müller *et al.*, 2021; Ogiemwonyi *et al.*, 2023; Eunike *et al.*, 2025). Researchers argue that as individuals increasingly view environmental protection as a personal obligation, their intention to participate in environmental activities becomes more robust. Within this research context, felt obligation towards environmental protection represents an individual's sense of duty to contribute actions that support environmental sustainability.

Based on these arguments and evidence, the following hypothesis is posited:

- H1. Felt obligation towards environmental protection positively influences green vehicle usage intention.

### 2.2 Attitude towards environmental issues and green vehicle usage intention

According to TPB, attitude is acknowledged as having the strongest explanatory power in predicting behavioral intention (Ajzen, 1991; McEachan, 2011). AEI refers to consumers' perspectives, beliefs, and behavioral tendencies regarding environmental issues and sustainable development (Cheung and To, 2019). This attitude originates from individuals' concept of self and perception of being part of the natural environment. It is referred to as an individual's beliefs related to the environment and its issues (Schultz *et al.*, 2004). This attitude manifests through individuals' environmental concerns, such as reading newspapers about pollution issues and being willing to engage in environmentally friendly consumption behaviors, for example, ceasing to purchase products from companies that violate environmental regulations (Ritter *et al.*, 2015).

When reviewing research on attitudes towards environmental issues, most studies consistently conclude that AEI positively influences the intention to purchase and use environmentally friendly products. Bulsara and Trivedi (2023) demonstrated that environmental attitudes impact consumers' intentions to purchase environmentally friendly products. Similarly, Varshneya *et al.* (2017) concluded that individuals with positive attitudes toward environmental protection will participate in sustainability-focused activities and orient themselves toward environmentally friendly product purchasing behaviors.

Kotchen and Reiling (2000) highlighted that AEI serves as a motivational factor in shaping behavioral intentions. Kumar *et al.* (2017), Lin and Huang (2012), and Cheung and To (2019) concurred that consumers with a positive AEI will develop intentions to purchase

environmentally friendly products. Consequently, individuals with high environmental concern typically select environmentally friendly products with environmental responsibility (Laroche *et al.*, 2001).

Based on these arguments and empirical evidence, the following hypothesis is posited:

*H2a.* Attitude towards environmental issues positively influences green vehicle usage intention.

Unlike previous studies that often position felt obligation as an independent variable or a mediator between personal norms and behavioral intentions (e.g. Onwezen *et al.*, 2013; Han, 2015), our conceptualization distinguishes between these two roles depending on the nature of the attitudinal construct. Specifically, in the relationship between AEI and green vehicle usage intention, felt obligation is proposed as a mediator. This is because AEI largely reflects individuals' cognitive awareness of environmental problems, which by itself may not be sufficient to drive behavioral intention. In this case, felt obligation functions as the psychological mechanism that transforms abstract environmental concerns into a sense of personal duty, thereby bridging the gap between cognition and action. The theory for this hypothesis is Cognitive Dissonance Theory (Miller *et al.*, 2015). This theory suggests that people tend to maintain consistency between their cognitions and actions. Therefore, a strong pro-environmental attitude that is not accompanied by corresponding actions will create psychological tension. To resolve this dissonance, individuals will develop a sense of obligation, forcing them to act so that their cognitions and behaviors become congruent. This argument is supported by empirical evidence. Consumers who are deeply concerned about environmental degradation often feel obligated to engage in more responsible consumption behaviors (Choi *et al.*, 2015). Similarly, in the hospitality industry, Han *et al.* (2020) also showed that positive environmental attitudes promote a sense of responsibility, which in turn leads to sustainable service choices.

Based on these arguments and evidence, the research team proposes the following hypotheses:

*H2b.* Attitude towards environmental issues positively influences felt obligation towards environmental protection.

*H2c.* Felt obligation towards environmental protection mediates the relationship between attitude towards environmental issues and green vehicle usage intention.

### *2.3 Attitude towards eco-social benefits and green vehicle usage intention*

Furthermore, attitude towards eco-social benefits of green consumption reflects the extent to which consumers endorse green consumption behaviors that benefit both the environment and society (Ritter *et al.*, 2015). Cheung and To (2019) assert that this concept evaluates the degree to which consumers are inclined to demand eco-friendly products and agree that purchasing such products yields social benefits and engenders a positive ethical sentiment by contributing to environmental protection through sustainable consumption. Moreover, these consumers typically possess strong personal ethical standards and a heightened awareness of the imperative to engage in green consumption activities (Choi *et al.*, 2015; Han, 2015). Hong *et al.* (2024) have further demonstrated the impact of attitude towards eco-social benefits on the intention to consume eco-friendly products. In this study, attitude towards eco-social benefits is understood as the level of interest and willingness to act in favor of using green vehicles, based on the belief that using such vehicles will benefit both the environment and society while aligning with societal ethical norms. Consequently, individuals will be more inclined to use green vehicles.

Based on these arguments and evidence, the research team proposes the following hypothesis:

*H3a.* Attitude towards eco-social benefits positively influences intention to use green vehicles.

A new finding in this study lies in exploring the role of felt obligation in the relationship between attitude towards eco-social benefits and UI. Unlike AEI, attitude towards eco-social benefits of green vehicles (AEB) already incorporates normative and ethical elements, which provide a relatively direct pathway to intention. Here, felt obligation does not mediate but instead conditions the strength of this link. This construct is not just about awareness and beliefs like AEI but about endorsing pro-environmental behaviors for their ethical and social benefits. Although no prior research has explicitly identified this relationship, the hypothesis may be in line with the studies of Recker *et al.* (1994) and Gorsuch and Ortberg (1983). According to Recker *et al.* (1994), felt obligation acts as a boundary for the influence of independent variables in the TPB model on behavioral intentions. Bobek and Hatfield (2003) explained this as meaning that felt obligation serves as a moderating factor that reduces the impact of other variables on intention, including attitudes. When examining the relationship between moral obligations and attitudes, Gorsuch and Ortberg (1983) also found that in moral situations, individuals intend to act based on what they perceive as morally responsible, regardless of their personal preferences. In the context of green vehicles, this can be interpreted that individuals will have stronger UI green vehicles if they feel a stronger sense of obligation, regardless of whether they hold a positive attitude toward their benefits. In such cases, intention is shaped largely by obligation, with minimal influence from attitudes. Conversely, if their perceived obligation is low, behavioral intention will depend more on their attitude toward the eco-social benefits of green vehicles.

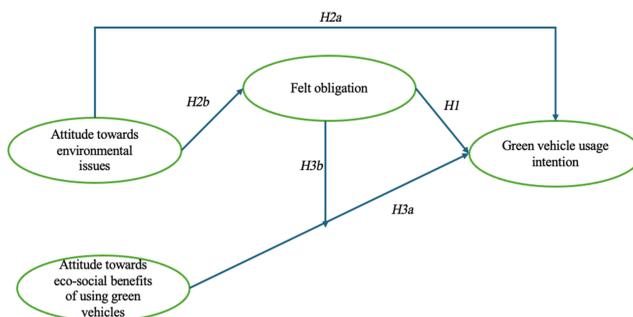
Based on the above arguments and evidence, our research team proposes the following hypothesis:

*H3b.* Felt obligation towards environmental protection negatively moderates the relationship between attitude towards eco-social benefits and intention to use green vehicles.

In summary, the proposed research model is as follows in Figure 1.

### 3. Research method

Our institution does not require ethics review board approval for research conducted by staff and students. However, the authors confirm that the study adheres to the relevant ethical guidelines for human participants, and that it followed ethical measures in compliance with institutional and international guidelines. In our research, respondents were provided with written consent forms and assured of their anonymity, ensuring adherence to ethical standards. Prior to commencing data collection, the participants were provided with detailed information



**Figure 1.** Proposed research model. Source: Authors' own work

about the study's procedures and fully informed about the purpose of the research and the study's aims, their rights as respondents (including the right to refuse participation or withdraw from the study at any time), and the measures taken to ensure their confidentiality and anonymity. Written informed consent was obtained from all participants before they take part in the study.

Data for this study were collected using convenience sampling via an online survey conducted on social media platforms. This research employs a quantitative approach, with the survey instrument developed based on measurement scales from previous studies: AEI (Cheung and To, 2019), attitude towards eco-social benefits (Cheung and To, 2019), felt obligation towards environmental protection (Chen *et al.*, 2023), and UI (Shalender and Sharma, 2021) (see Appendix A1).

Previous methodological studies have acknowledged that convenience sampling can be an appropriate approach in certain situations, particularly when the target population is large, research resources such as time, funding, and workforce are limited, and the primary objective is to explore relationships or test theoretical models rather than to generate population-wide estimates (Etikan *et al.*, 2016; Acharya *et al.*, 2013). Etikan *et al.* (2016) also describe a specific variation known as homogeneous convenience sampling, in which researchers intentionally limit one or more demographic characteristics—such as ethnicity, gender, or socio-economic status to focus on a relatively uniform subgroup. This technique can facilitate clearer generalizations within that subgroup and reduce certain types of bias, although the findings remain generalizable only to populations with similar characteristics. In the present study, the sampling approach aligns with the concept of homogeneous convenience sampling. Most respondents came from major urban areas with well-developed green mobility systems, which share socio-economic and infrastructural similarities relevant to the research objectives. Although this choice narrows the applicability of the results to rural or less-developed regions, it strengthens the internal validity of the findings within urban green transport populations. The use of online platforms further allowed for efficient recruitment from multiple cities, yielding 436 responses, of which 408 were deemed valid after excluding 28 incomplete or invalid entries (6.4%).

To assess representativeness, the sample demographics were compared with national statistics from the General Statistics Office of Vietnam (General Statistics Office of Vietnam GSO, 2024). The gender distribution (57.4% female, 42.6% male) closely matches the national adult ratio (50.2% female, 49.8% male), and age groups are balanced across the working-age population. Most respondents were from major urban centers—Hanoi (38%) and Ho Chi Minh City (30.9%), followed by Da Nang (13.7%) and Hai Phong (12%), consistent with the higher prevalence of green transportation in these cities. In terms of income, 39.7% earned 5–15 million VND, 37% earned over 15 million VND, and 23% earned under 5 million VND. Overall, the alignment in gender, age, and urban distribution suggests a reasonable level of representativeness. To assess the potential for common method bias, both procedural and statistical remedies were applied. Procedurally, we assured respondent anonymity, randomized the order of items, and separated constructs in the survey design to reduce the likelihood of bias (Podsakoff *et al.*, 2003). Statistically, we conducted Harman's single-factor test. The unrotated factor solution indicated that the first factor accounted for 42.39% of the variance, which is below the recommended threshold of 50%. This suggests that common method variance is unlikely to pose a serious concern in our data. Furthermore, we tested the distributional properties of the key constructs (AEI, AEB, FO, and UI). The skewness and kurtosis values were within the acceptable range ( $\pm 1$ ), suggesting approximate normality despite the Shapiro–Wilk test being significant at  $p < 0.001$ , which is common with large samples ( $N = 408$ ). Given these diagnostics, the structural equation modeling (SEM) results can be considered robust against common method concerns and distributional assumptions.

Regarding felt obligation (FO), although it represents a moral norm, prior research has validated its measurement via short self-report scales in both organizational and online contexts (Eisenberger *et al.*, 2001; Liang *et al.*, 2007). In this study, FO was measured with a

five-item scale, which demonstrated high internal consistency (Cronbach's  $\alpha = 0.923$ , composite reliability = 0.929, average variance extracted (AVE) = 0.723). Self-report scales are considered appropriate for capturing internalized moral beliefs when behavioral measures are impractical. Nevertheless, we acknowledge that self-report may not fully reflect enacted behavior, and future research may complement this approach with behavioral or longitudinal measures.

SPSS 26.0 and AMOS 26 were employed to assess the reliability of the measurement scales and to test the research hypotheses. The analysis not only evaluated the reliability, discriminant validity, and convergent validity of the scales but also provided standardized regression coefficients within the research model. Additionally, the PROCESS macro was used to examine the moderating effects of specific variables on the proposed hypotheses. Furthermore, the impact of mediating variables within the model was analyzed in detail using a non-parametric Bootstrap method with 5,000 samples.

## 4. Results

### 4.1 Reliability, convergent validity, and discriminant validity of measurement items

The reliability of variables was assessed using the Cronbach's Alpha coefficient and the AVE. After two rounds of analysis and the elimination of factors not meeting standard criteria, the reliability assessment results of the variables were compiled in [Appendix A1](#). All Cronbach's Alpha values exceeded 0.7, indicating acceptable reliability levels ([Hair et al., 2019](#)). Simultaneously, AVE values ranged from 0.513 to 0.751, confirming the convergent validity of the model ([Hair et al., 2019](#)). Consequently, the measurement scales used in the study satisfy the convergent validity requirements.

According to [Henseler et al. \(2015\)](#), discriminant validity is confirmed when the Heterotrait-Monotrait Ratio (HTMT) is  $< 1$ . When HTMT  $< 0.9$ , the discriminant validity is considered satisfactory. Results in [Appendix A2](#) demonstrate that all structural constructs have HTMT values below 0.9, thus validating the discriminant validity.

The results confirm that the measurement scales in the research model satisfactorily meet the criteria for reliability and validity. Therefore, these measurement scales were used to analyze the structural model.

### 4.2 Model assessment results

The SEM analysis results showed Chi-square = 454.225;  $df = 128$  and  $P$ -value = 0.000. The model fit index: Chi-square/ $df = 3.549$  is below 5, which is acceptable. The results demonstrate that the structural and measurement models are compatible with the survey dataset: comparative fit index (CFI) = 0.930, which exceeds the recommended threshold of 0.90; root mean square error of approximation = 0.082, which is within the range considered acceptable ([Hu and Bentler, 1999](#)). The Tucker-Lewis Index = 0.917, surpassing 0.9 and is evaluated as good. The goodness-of-fit index = 0.895, higher than 0.8 and considered acceptable. Based on these results, the study concludes that the model has a significant fit with the market data.

The estimation results and hypothesis testing details shown in [Appendix A3](#) indicate that most direct relationships between variables statistically significant. Specifically, almost all research hypotheses were accepted at a 95% confidence level due to the  $P$ -value being lower than 0.05, except for the direct impact of the *AEI* and *Attitude towards eco-social benefits towards green vehicle usage intention*.

Statistical analysis reveals the correlation between environmental factors and green vehicles usage intention. Specifically, attitude towards eco-social benefits (AEB) and felt obligation (FO) positively influence green vehicle usage intention (IU), with standardized regression coefficients of 0.153 and 0.334, respectively. However, environmental attitude (AEI) does not directly impact green vehicles use intention.

#### 4.3 Bootstrap test with mediating variables

To verify the mediating role, the research team applied the bootstrap confidence interval method with 5,000 bootstrap resamples, based on the method proposed by [Preacher and Hayes \(2008\)](#). The purpose was to determine the mediating role of the felt obligation in the relationship between environmental attitude and green vehicle usage intention. The analysis results in [Appendix A4](#) show an indirect effect with a coefficient of 0.064 ( $p$ -value  $< 0.05$ ), thereby confirming [Hypothesis 2c](#).

#### 4.4 Macro process test with moderating effects

To evaluate the moderating role of Felt obligation (FO) in the relationship between Attitude towards eco-social benefits (AEB) and UI, the research team employed the Process testing method as presented in [Appendix A5](#). Statistical results reveal that the  $p$ -values for both AEB and FO factors are 0.0000, which is below the 0.05 threshold, demonstrating significant influences on the dependent variable UI, confirming [Hypothesis 3b](#).

Furthermore, the  $p$ -value of Int\_1 at 0.0157 ( $p < 0.05$ ) confirms that the AEB\*FO interaction product negatively impacts usage intention. The unstandardized coefficient ( $-0.0696 < 0$ ) indicates that as the felt obligation factor increases, the impact of attitude towards eco-social benefits on usage intention will be progressively diminished.

## 5. Discussion, implications and limitations

### 5.1 Discussion of research results

This study presents empirical evidence on the role of felt obligation for environmental protection in the relationship between attitudes toward environmental issues, attitudes toward eco-social benefits of using green vehicles, and the UI such transportation modes. Analysis results indicate that felt obligation for environmental protection exerts the strongest influence on the UI green vehicles. This conclusion aligns with prior studies by [Müller et al. \(2021\)](#), [Wu and Liu \(2023\)](#) and [Cui et al. \(2024\)](#). The findings suggest that when consumers perceive green behaviors to be aligned with their personal circumstances, capabilities, and moral values, in addition to regarding them as meaningful actions for environmental preservation, they are more likely to develop an UI green vehicles, specifically by using green vehicles. Conversely, if green behaviors are perceived as ineffective or lacking significant positive contributions to the environment and society, the UI green vehicles declines. Therefore, strengthening the felt obligation to encourage the adoption of green behaviors is identified as a key factor in fostering consumer UI green vehicles.

The study also confirms a positive relationship between the attitudes toward eco-social benefits of using green vehicles and the UI such green vehicles modes. This finding is consistent with the prior research of [Cheung and To \(2019\)](#). When individuals hold positive attitudes towards eco-social benefits of using green vehicles, their UI these types of vehicles increases. However, the moderate effect size suggests that attitude alone does not significantly influence intention. A study by [Hong et al. \(2024\)](#) similarly found that attitudes towards eco-social benefits do not exert a substantial impact on consumers' UI environmentally friendly products.

Although the TPB posits a positive relationship between attitudes and behavioral intention, the results of this study indicate that attitudes toward environmental issues do not directly influence the UI green vehicles. This finding has pointed out the weak and often non-existent link between attitudes and behavioral intention under the TPB framework ([Claudy et al., 2013](#)). This finding is in line with the statement of previous study showing that despite consumers' positive attitude toward green consumption, they do not necessarily possess intention or perform actual purchase behavior. This can be explained by the "green gap" phenomenon, also referred to as the attitude–intention gap ([Elhaffar and Dubé, 2020](#)). Particularly, the green gap highlights that pro-environmental attitudes do not always translate

into corresponding behavioral intentions, particularly in contexts where structural and situational barriers prevail. Haffar *et al.* (2020) emphasize that these gaps may be driven by a combination of contextual constraints such as high purchase costs, green trade-off, functional risk, temporal risk, lack of availability and physical context. In the context of green transportation, such barriers may override the influence of positive environmental attitudes, preventing them from being converted into a concrete intention to adopt green vehicles. Many previous studies highlighted the attitude–intention gap in the context of green consumption such as sustainable food (Vermeir and Verbeke, 2006), new energy vehicles (Ye and Zhou, 2012), renewable energy (Vermeir and Verbeke, 2006; Nolan *et al.*, 2008). Notably, the main reason for the attitude–intention gap in green consumption is that higher costs of money, energy, and time make consumers weigh pros and cons; even with strong pro-environmental attitudes, and these costs can deter intentions and behaviors (Wang *et al.*, 2021). In conclusion, the absence of a direct link between attitude and intention in our study is actually consistent with empirical evidence. In the context of green vehicles, barriers such as cost, availability, and perceived risks genuinely disrupt the pathway from “attitude” to “intention”. Our research makes a meaningful contribution to the field by demonstrating in practice that TPB may need to be expanded or adjusted when applied to contexts characterized by the “green gap.”

However, attitudes toward environmental issues have an indirect and positive impact through the felt obligation for environmental protection. Han *et al.* (2020) reached a similar conclusion in their study on factors influencing customer engagement with green hotels. A plausible explanation is that, although consumers are increasingly concerned about the environment, barriers related to infrastructure, cost, and consumption culture still play a more significant role in transportation choice decisions in Vietnam (Nguyen Thi Bich and Le Dinh, 2024). This trend is not only observed in Vietnam but is also documented in other developing countries, where supportive policies, financial subsidies, and the availability of public infrastructure have a stronger influence than individual attitudes (Tolani *et al.*, 2025). For instance, in Thailand and Indonesia, factors such as subsidies, tax incentives, and charging infrastructure serve as primary drivers promoting usage behavior, while in China, the combination of vehicle purchase subsidy policies with the expansion of charging station networks has created a pronounced impact on electric vehicle sales (Piriypada and Wasawong, 2024; Hasudungan *et al.*, 2024; Zheng *et al.*, 2022). Therefore, the findings of this study not only reflect Vietnam’s specificities but may also be generalizable to other emerging economies with similar contexts.

Finally, the study reveals that felt obligation negatively moderates the relationship between attitude towards eco-social benefits and the UI green vehicles. When individuals strongly perceive a high level of obligation to engage in environmentally protective behaviors, the impact of attitudes towards eco-social benefits on the UI green vehicles is weakened. This finding is reasonable because individuals with a strong sense of obligation are inclined to conduct pro-environmental behavior (Jaini *et al.*, 2020; Chua *et al.*, 2020). In that case, individuals tend to use green vehicles regardless of attitudes toward eco-social benefits of using green vehicles. Conversely, in the absence of such a felt obligation, UI green vehicles become more reliant on attitudes towards eco-social benefits of using green vehicles.

### 5.2 Theoretical implications

This study systematically presents the theoretical framework and examines the influence of various factors related to consumer attitudes toward green vehicles and their UI such transportation in major cities in Vietnam. The findings indicate that felt obligation toward environmental preservation exerts the most significant impact and serves as a full mediator in the relationship between attitudes toward environmental issues and the UI green vehicles.

Specifically, felt obligation in this study is proposed to extend the TPB’s normative component. Unlike the traditional perceived social norm, i.e. external pressure, felt obligation, when added, tends to reflect the sense of moral obligation rooted in personal responsibility.

This captures how self-imposed pressure, rather than external pressure, can directly foster behavioral intention. Thus, felt obligation can complement subjective norms to strengthen the explanatory power of traditional TPB constructs. This finding aligns with previous literature that altruistic values, concern for others, could shape consumer pressure over green vehicle purchase decisions (Wang *et al.*, 2022). Furthermore, when attitudes toward eco-social benefits of the behavior are included into the TPB model, they could provide a more thorough understanding of how eco-social factors can synergize with other traditional TPB constructs. More importantly, the negative moderating effect of felt obligation in the relationship between AEB and the UI green vehicles can be considered as a compensatory mechanism in TPB model. The power of felt obligation can be maximized in case of the absence of or less favorable attitudes towards eco-social benefits of the behavior. With high levels of felt obligation, the role of attitudes towards eco-social benefits of the behavior tends to be weakened. This emphasizes that besides the well-established role of attitudes, the incorporation of both moral and normative constructs seems to be able to predict green vehicle usage intention.

Moreover, incorporating felt obligation (FO) into the TPB framework proves valuable not only in the Vietnamese context but also offers broader generalizability for cross-national environmental behavior research. Previous studies have demonstrated that personal norms, including FO, are important extension to the TPB, helping to explain the “green gap” when positive attitudes do not always lead to actual behavior (Bamberg and Möser, 2007; Onwezen *et al.*, 2013). Bamberg and Möser’s (2007) meta-analysis highlight that personal norms often predict environmental behavior more strongly than attitudes and subjective norms alone. In particular, recent evidence indicates that even when personal costs or infrastructure barriers increase, personal norms remain effective if moral values are internalized (Niu *et al.*, 2023). This suggests that FO can compensate for contextual limitations and thus retain its predictive role in countries with underdeveloped infrastructure or limited policy support. At the same time, research on social norms shows that public policies and infrastructure indirectly shape personal norms by influencing broader social norms (Kinzig *et al.*, 2013). Thus, FO is not only useful in conditions of deprivation but also reflects the sustainability of individual norms when the policy context fluctuates. The integration of FO into the TPB provides a flexible and highly generalizable conceptual framework that allows for consistent explanations of green behavior across different countries and infrastructure systems.

### 5.3 Practical implications

Based on the empirical findings, this study offers practical insights for both firms and policymakers. The results suggest that while attitudes toward eco-social benefits play a role in shaping intention, they are insufficient in isolation. Instead, felt obligation (FO) emerges as the decisive mechanism, acting both as a full mediator of environmental attitudes and as a moderator that compensates when eco-social attitudes are weak. This highlights that interventions targeting FO are more effective in shaping behavioral intentions than strategies relying solely on factual information about environmental harm.

For green vehicle manufacturers, the implication is that fact-based messaging highlighting pollution or climate risks can foster eco-social attitudes. However, felt obligation priming messages, framing adoption as a personal duty and moral responsibility, exert stronger and more consistent influence on intention. To strengthen attitude towards eco-social benefits, companies should facilitate direct consumer engagement with green vehicles through experiential programs and develop multi-platform communication campaigns, especially on social media, to raise awareness of environmental advantages. Emphasizing the negative impacts of traditional transportation creates crucial contrast effects that enhance positive attitudes toward green alternatives. Campaigns should involve influential environmental figures while companies maintain strict ethical and environmental standards to build credibility. Given that felt obligation emerged as a stronger driver than attitudes, firms should

frame adoption not merely as a rational choice but as a moral responsibility. Campaigns can highlight the ethical dimension of individual contributions, supported by tools such as personalized impact calculators, commitment pledges, or narratives from socially responsible role models. Compared to fact-heavy environmental messaging, approaches that highlight moral responsibility are more effective in triggering enduring behavioral change. Additionally, community engagement programs and collaborations with environmental organizations can further institutionalize felt obligation in consumer mindsets, ensuring that intention is maintained even when structural barriers or skepticism reduce the strength of attitudes.

From the governmental perspective, the study proposes several measures to promote the usage of green vehicles among citizens by strengthening the influence of attitudes towards eco-social benefit and felt obligation. First, public authorities should implement a monitoring system and regularly publish environmental pollution data related to transportation, combined with multi-channel communication campaigns on social responsibility. In terms of policy, the study recommends a dual-incentive mechanism: on the one hand, supporting businesses through tax policies, preferential loans, and investment in research and development; on the other hand, encouraging consumers through financial incentives and infrastructure improvements. Regarding felt obligation toward environmental conservation, from the public sector, communication should prime felt obligation rather than rely only on pollution statistics. Campaigns need to frame green vehicle adoption as a civic duty and intergenerational responsibility, showing that individual choices shape collective outcomes. This can be reinforced through eco-labels, public service announcements and transparent emissions disclosure. Policy should combine tax relief and R&D support for firms with consumer subsidies and infrastructure expansion. Aligning obligation-based framing with tangible incentives can help bridge the attitude–intention gap and accelerate adoption.

#### 5.4 Limitations and recommendations for future research

Although the study has certain limitations regarding sample selection and research scope, its findings remain significant, offering valuable insights for policy planning and the strategic development of green vehicles in Vietnam. Moreover, the study provides a solid scientific foundation for designing effective communication campaigns and encouraging public adoption of green vehicles in the future.

#### Data availability

All data supporting this study are provided upon request from the corresponding author.

#### Supplementary material

The supplementary material for this article can be found online.

#### References

- Acharya, A.S., Prakash, A., Saxena, P. and Nigam, A. (2013), “Sampling: why and how of it”, *Indian Journal of Medical Specialties*, Vol. 4 No. 2, pp. 330-333, doi: [10.7713/ijms.2013.0032](https://doi.org/10.7713/ijms.2013.0032).
- Ajzen, I. (1991), “The theory of planned behavior”, *Organizational Behavior and Human Decision Processes*, Vol. 50 No. 2, pp. 179-211, doi: [10.1016/0749-5978\(91\)90020-T](https://doi.org/10.1016/0749-5978(91)90020-T).
- Alam, M.N., Ogiemwonyi, O., Hago, I.E., Azizan, N.A., Hashim, F. and Hossain, M.S. (2023), *Understanding Consumer Environmental Ethics and the Willingness to Use Green Products*, *Sage Open*, Vol. 13 No. 1, 21582440221149727.
- Bamberg, S. and Möser, G. (2007), “Twenty years after hines, hungerford, and Tomera: a new meta-analysis of psycho-social determinants of pro-environmental behaviour”, *Journal of Environmental Psychology*, Vol. 27 No. 1, pp. 14-25, doi: [10.1016/j.jenvp.2006.12.002](https://doi.org/10.1016/j.jenvp.2006.12.002).

- Barbarossa, C. and De Pelsmacker, P. (2016), "Positive and negative antecedents of purchasing eco-friendly products: a comparison between green and non-green consumers", *Journal of Business Ethics*, Vol. 134 No. 2, pp. 229-247, doi: [10.1007/s10551-014-2425-z](https://doi.org/10.1007/s10551-014-2425-z).
- Binh, L.P. (2022), "Ô nhiễm không khí: 70% do phương tiện giao thông", *Kinh Tế và Đô Thị*, available at: <https://kinhtedothi.vn/o-nhiem-khong-khi-70-do-phuong-tien-giao-thong.html>
- Bobek, D. and Hatfield, R. (2003), "An investigation of the theory of planned behavior and the role of moral obligation in tax compliance", *Behavioral Research in Accounting*, Vol. 15 No. 1, pp. 13-38, doi: [10.2308/bria.2003.15.1.13](https://doi.org/10.2308/bria.2003.15.1.13).
- Bulsara, H.P. and Trivedi, M. (2023), "Exploring the role of availability and willingness to pay premium in influencing smart city customers' purchase intentions for green food products", *Ecology of Food and Nutrition*, Vol. 62 Nos 3-4, pp. 107-129, doi: [10.1080/03670244.2023.2200942](https://doi.org/10.1080/03670244.2023.2200942).
- Chen, L., Matloob, S., Sunlei, Y., Qalati, S.A., Raza, A. and Limón, M.L.S. (2023), "A moderated-mediated model for eco-conscious consumer behavior", *Sustainability*, Vol. 15 No. 2, p. 897, doi: [10.3390/su15020897](https://doi.org/10.3390/su15020897).
- Cheung, M.F.Y. and To, W.M. (2019), "An extended model of value-attitude-behavior to explain Chinese consumers' green purchase behavior", *Journal of Retailing and Consumer Services*, Vol. 50, pp. 145-153, doi: [10.1016/j.jretconser.2019.04.006](https://doi.org/10.1016/j.jretconser.2019.04.006).
- Choi, H., Jang, J. and Kandampully, J. (2015), "Application of the extended VBN theory to understand consumers' decisions about green hotels", *International Journal of Hospitality Management*, Vol. 51, pp. 87-95, doi: [10.1016/j.ijhm.2015.08.004](https://doi.org/10.1016/j.ijhm.2015.08.004).
- Chua, K.B., Quoquab, F. and Mohammad, J. (2020), "Factors affecting environmental citizenship behaviour: an empirical investigation in Malaysian paddy industry", *Asia Pacific Journal of Marketing and Logistics*, Vol. 32 No. 1, pp. 86-104, doi: [10.1108/APJML-05-2018-0177](https://doi.org/10.1108/APJML-05-2018-0177).
- Claudy, M.C., Peterson, M. and O'Driscoll, A. (2013), "Understanding the attitude-behavior gap for renewable energy systems using behavioral reasoning theory", *Journal of Macromarketing*, Vol. 33 No. 4, pp. 273-287, doi: [10.1177/0276146713481605](https://doi.org/10.1177/0276146713481605).
- Cui, M., Li, Y. and Wang, S. (2024), "Environmental knowledge and green purchase intention and behavior in China: the mediating role of moral obligation", *Sustainability (2071-1050)*, Vol. 16 No. 14.
- Dadwal, S., Jamal, A., Harris, T., Brown, G. and Raudhah, S. (2020), "Technology and sharing economy-based business models for marketing to connected consumers", pp. 62-93, doi: [10.4018/978-1-7998-0131-3.ch004](https://doi.org/10.4018/978-1-7998-0131-3.ch004).
- Eisenberger, R., Armeli, S., Rexwinkel, B., Lynch, P.D. and Rhoades, L. (2001), "Reciprocation of perceived organizational support", *Journal of Applied Psychology*, Vol. 86 No. 1, pp. 42-51, doi: [10.1037//0021-9010.86.1.42](https://doi.org/10.1037//0021-9010.86.1.42).
- Elhaffar, G., Dubé, L. and Dubé, L. (2020), "Towards closing the attitude-intention-behavior gap in green consumption: a narrative review of the literature and an overview of future research directions", *Journal of Cleaner Production*, Vol. 275, 122556, doi: [10.1016/j.jclepro.2020.122556](https://doi.org/10.1016/j.jclepro.2020.122556).
- EPA (2024), *Smog, Soot, and Other Air Pollution from Transportation*, U.S. Environmental Protection Agency, available at: <https://www.epa.gov/transportation-air-pollution-and-climate-change/smog-soot-and-other-air-pollution-transportation>
- Etikan, I., Musa, S.A. and Alkassim, R.S. (2016), "Comparison of convenience sampling and purposive sampling", *American Journal of Theoretical and Applied Statistics*, Vol. 5 No. 1, pp. 1-4.
- Eunike, I.J., Silalahi, A.D.K. and Tedjakusuma, A.P. (2025), "Towards a holistic model of green consumerism by integrating ethical obligations, collective efficacy, and environmental concerns in sustainable purchase behavior", *Sustainable Futures*, Vol. 9, 100746, doi: [10.1016/j.sfr.2025.100746](https://doi.org/10.1016/j.sfr.2025.100746).
- General Statistics Office of Vietnam (GSO) (2024), *Statistical Yearbook of Viet Nam 2024*, Statistical Publishing House, Hanoi, available at: <https://www.gso.gov.vn/en/statistical-yearbook-of-vietnam-2024>

- Gorsuch, R.L. and Ortberg, J. (1983), "Moral obligation and attitudes: their relation to behavioral intentions", *Journal of Personality and Social Psychology*, Vol. 44 No. 5, pp. 1025-1028, doi: [10.1037//0022-3514.44.5.1025](https://doi.org/10.1037//0022-3514.44.5.1025).
- Hair, J.F., Black, W.C., Babin, B.J. and Anderson, R.E. (2019), *Multivariate Data Analysis*, Cengage, available at: <https://books.google.com.vn/books?id=0R9ZswEACAAJ>
- Han, H. (2015), "Travelers' pro-environmental behavior in a green lodging context: converging value-belief-norm theory and the theory of planned behavior", *Tourism Management*, Vol. 47, pp. 164-177, doi: [10.1016/j.tourman.2014.09.014](https://doi.org/10.1016/j.tourman.2014.09.014).
- Han, H., Chen, C., Lho, L.H., Kim, H. and Yu, J. (2020), "Green hotels: exploring the drivers of customer approach behaviors for green consumption", *Sustainability*, Vol. 12 No. 21, pp. 1-14, doi: [10.3390/su12219144](https://doi.org/10.3390/su12219144).
- Hasudungan, A., Tandean, B., Aurelius, E., Widarsyah, R. and Artha, I.K.D.S. (2024), "The impact of government incentives on electric vehicle adoption in the metropolitan Jakarta Area", *Jurnal Ekonomi Pembangunan*, Vol. 21 No. 2, pp. 191-199, doi: [10.29259/jep.v21i2.23050](https://doi.org/10.29259/jep.v21i2.23050).
- Henseler, J., Ringle, C. and Sarstedt, M. (2015), "A new criterion for assessing discriminant validity in variance-based structural equation modeling", *Journal of the Academy of Marketing Science*, Vol. 43 No. 1, pp. 115-135, doi: [10.1007/s11747-014-0403-8](https://doi.org/10.1007/s11747-014-0403-8).
- Hong, Y., Al Mamun, A., Masukujaman, M. and Yang, Q. (2024), "Sustainable consumption practices among Chinese youth", *Humanities and Social Sciences Communications*, Vol. 11 No. 1, 1058, doi: [10.1057/s41599-024-03582-5](https://doi.org/10.1057/s41599-024-03582-5).
- Hu, L.T. and Bentler, P.M. (1999), "Cutoff criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives", *Structural Equation Modeling: A Multidisciplinary Journal*, Vol. 6 No. 1, pp. 1-55, doi: [10.1080/10705519909540118](https://doi.org/10.1080/10705519909540118).
- IEA (2021), "Global CO2 emissions from transport by subsector, 2000-2030", available at: <https://www.iea.org/data-and-statistics/charts/global-co2-emissions-from-transport-by-subsector-2000-2030>
- Jaini, A., Quoquab, F., Mohammad, J. and Hussin, N. (2020), "I buy green products, do you...? The moderating effect of eWOM on green purchase behavior in Malaysian cosmetics industry", *International Journal of Pharmaceutical and Healthcare Marketing*, Vol. 14 No. 1, pp. 89-112, doi: [10.1108/IJPHM-02-2019-0017](https://doi.org/10.1108/IJPHM-02-2019-0017).
- Kinzig, A.P., Ehrlich, P.R., Alston, L.J., Arrow, K., Barrett, S., Buchman, T.G., Daily, G.C., Levin, B., Levin, S., Oppenheimer, M., Ostrom, E. and Saari, D. (2013), "Social norms and global environmental challenges: the complex interaction of behaviors, values, and policy", *BioScience*, Vol. 63 No. 3, pp. 164-175, doi: [10.1525/bio.2013.63.3.5](https://doi.org/10.1525/bio.2013.63.3.5).
- Kotchen, M.J. and Reiling, S.D. (2000), "Environmental attitudes, motivations, and contingent valuation of nonuse values: a case study involving endangered species", *Ecological Economics*, Vol. 32 No. 1, pp. 93-107, doi: [10.1016/s0921-8009\(99\)00069-5](https://doi.org/10.1016/s0921-8009(99)00069-5).
- Kumar, B., Manrai, A.K. and Manrai, L.A. (2017), "Purchasing behaviour for environmentally sustainable products: a conceptual framework and empirical study", *Journal of Retailing and Consumer Services*, Vol. 34, pp. 1-9, doi: [10.1016/j.jretconser.2016.09.004](https://doi.org/10.1016/j.jretconser.2016.09.004).
- Laroche, M., Bergeron, J. and Barbaro-Forleo, G. (2001), "Targeting consumers who are willing to pay more for environmentally friendly products", *Journal of Consumer Marketing*, Vol. 18 No. 6, pp. 503-520, doi: [10.1108/EUM000000000006155](https://doi.org/10.1108/EUM000000000006155).
- Liang, H., Saraf, N., Hu, Q. and Xue, Y. (2007), "Assimilation of enterprise systems: the effect of institutional pressures and the mediating role of top management", *MIS Quarterly*, Vol. 31 No. 1, pp. 59-87, doi: [10.2307/25148781](https://doi.org/10.2307/25148781).
- Lin, P.C. and Huang, Y.H. (2012), "The influence factors on choice behavior regarding green products based on the theory of consumption values", *Journal of Cleaner Production*, Vol. 22 No. 1, pp. 11-18, doi: [10.1016/j.jclepro.2011.10.002](https://doi.org/10.1016/j.jclepro.2011.10.002).
- López-Mosquera, N. and Sánchez, M. (2012), "Theory of planned behavior and the value-belief-norm theory explaining willingness to pay for a suburban park", *Journal of Environmental Management*, Vol. 113, pp. 251-262, doi: [10.1016/j.jenvman.2012.08.029](https://doi.org/10.1016/j.jenvman.2012.08.029).

- Manstead, A.S. (1999), "The role of moral norm in the attitude-behavior relation", in *Attitudes, Behavior, and Social Context*, Psychology Press, pp. 11-30.
- McEachan, R.R.C. (2011), "Prospective prediction of health-related behaviours with the theory of planned behaviour: a meta-analysis", *Health Psychology Review*, Vol. 5 No. 2, pp. 97-144.
- Miller, M., Clark, J. and Jehle, A. (2015), "Cognitive dissonance theory (Festinger)", doi: [10.1002/9781405165518.wbeosc058.pub2](https://doi.org/10.1002/9781405165518.wbeosc058.pub2).
- Mohiuddin, M., Al Mamun, A., Syed, F.A., Masud, M.M. and Su, Z. (2018), "Environmental knowledge, awareness, and business school students' intentions to purchase green vehicles in emerging countries", *Sustainability*, Vol. 10 No. 5, p. 1534, doi: [10.3390/su10051534](https://doi.org/10.3390/su10051534).
- Müller, J., Acevedo-Duque, Á., Müller, S., Kalia, P. and Mehmood, K. (2021), "Predictive sustainability model based on the theory of planned behavior incorporating ecological conscience and moral obligation", *Sustainability*, Vol. 13 No. 8, p. 4248, doi: [10.3390/su13084248](https://doi.org/10.3390/su13084248).
- Nguyen Thi Bich, H. and Le Dinh, T. (2024), "Overcoming barriers to sustainable green transportation in Ho Chi Minh City: a pathway toward achieving SDGs 11 and 13", *Sustainability*, Vol. 16 No. 23, 10629, doi: [10.3390/su162310629](https://doi.org/10.3390/su162310629).
- Niu, N., Fan, W., Ren, M., Li, M. and Zhong, Y. (2023), "The role of social norms and personal costs on pro-environmental behavior: the mediating role of personal norms", *Psychology Research and Behavior Management*, Vol. 16, pp. 2059-2069, doi: [10.2147/prbm.s411640](https://doi.org/10.2147/prbm.s411640).
- Nolan, J.M., Schultz, P.W., Cialdini, R.B., Goldstein, N.J. and Griskevicius, V. (2008), "Normative social influence is underdetected", *Personality and Social Psychology Bulletin*, Vol. 34 No. 7, pp. 913-923, doi: [10.1177/0146167208316691](https://doi.org/10.1177/0146167208316691).
- Ogiemwonyi, O. and Jan, M.T. (2023), "The correlative influence of consumer ethical beliefs, environmental ethics, and moral obligation on green consumption behavior", *Resources, Conservation and Recycling Advances*, Vol. 19, 200171, doi: [10.1016/j.rcradv.2023.200171](https://doi.org/10.1016/j.rcradv.2023.200171).
- Oliver, J.D. and Lee, S.H. (2010), "Hybrid car purchase intentions: a cross-cultural analysis", *Journal of Consumer Marketing*, Vol. 27 No. 2, pp. 96-103, doi: [10.1108/07363761011027204](https://doi.org/10.1108/07363761011027204).
- Onwezen, M.C., Antonides, G. and Bartels, J. (2013), "The norm activation model: an exploration of the functions of anticipated pride and guilt in pro-environmental behaviour", *Journal of Economic Psychology*, Vol. 39, pp. 141-153, doi: [10.1016/j.joep.2013.07.005](https://doi.org/10.1016/j.joep.2013.07.005).
- Perugini, M. and Bagozzi, R.P. (2001), "The role of desires and anticipated emotions in goal-directed behaviours: broadening and deepening the theory of planned behaviour", *British Journal of Social Psychology*, Vol. 40 No. 1, pp. 79-98, doi: [10.1348/014466601164704](https://doi.org/10.1348/014466601164704).
- Phuong An (2023), "Phát triển hạ tầng đô thị tại Việt Nam: giảm phát thải khí nhà kính trong xây dựng", *Báo Xây Dựng*, available at: <https://baoxaydung.com.vn/phat-trien-ha-tang-do-thi-tai-viet-nam-giam-phat-thai-khi-nha-kinh-trong-xay-dung-366945.html>
- Piriyapada, S. and Wasawong, P. (2024), "Effects of government financial incentives, environmental concerns, and ev knowledge among USERS' ATTITUDE and purchase intention in Thailand", *วารสาร ปญญา ภิวัตน์*, Vol. 16 No. 2, pp. 48-69.
- Podsakoff, P.M., MacKenzie, S.B., Lee, J.Y. and Podsakoff, N.P. (2003), "Common method biases in behavioral research: a critical review of the literature and recommended remedies", *Journal of Applied Psychology*, Vol. 88 No. 5, p. 879.
- Preacher, K.J. and Hayes, A.F. (2008), "Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models", *Behavior Research Methods*, Vol. 40 No. 3, pp. 879-891, doi: [10.3758/BRM.40.3.879](https://doi.org/10.3758/BRM.40.3.879).
- Reckers, P.M.J., Sanders, D.L. and Roark, S.J. (1994), "The influence of ethical attitudes on taxpayer compliance", *National Tax Journal*, Vol. 47 No. 4, pp. 825-836, doi: [10.1086/ntj41789111](https://doi.org/10.1086/ntj41789111).
- Ritter, Á.M., Borchardt, M., Vaccaro, G.L.R., Pereira, G.M. and Almeida, F. (2015), "Motivations for promoting the consumption of green products in an emerging country: exploring attitudes of Brazilian consumers", *Journal of Cleaner Production*, Vol. 106, pp. 507-520, doi: [10.1016/j.jclepro.2014.11.066](https://doi.org/10.1016/j.jclepro.2014.11.066).

- Schultz, P.W., Shriver, C., Tabanico, J.J. and Khazian, A.M. (2004), "Implicit connections with nature", *Journal of Environmental Psychology*, Vol. 24 No. 1, pp. 31-42, doi: [10.1016/S0272-4944\(03\)00022-7](https://doi.org/10.1016/S0272-4944(03)00022-7).
- Schwartz, S. (1977), "Normative influences on altruism", pp. 221-279, doi: [10.1016/s0065-2601\(08\)60358-5](https://doi.org/10.1016/s0065-2601(08)60358-5).
- Shalender, K. and Sharma, N. (2021), "Using extended theory of planned behaviour (TPB) to predict adoption intention of electric vehicles in India", *Environment, Development and Sustainability*, Vol. 23 No. 1, pp. 665-681, doi: [10.1007/s10668-020-00602-7](https://doi.org/10.1007/s10668-020-00602-7).
- Thuận, L.V., Minh, N.V. and Trang, N.T.N. (2023), *Các yếu tố ảnh hưởng đến quyết định mua xe máy điện của người dân TP, Kinh Tế và Dự Báo, Cần Thơ*.
- Thương, N.T.H. and Hiếu, C.V. (2023), "Các nhân tố tác động đến ý định mua xe ô tô điện của người dân trên địa bàn tỉnh Bình Dương", *Tạp Chí Khoa Học và Công Nghệ - Trường Đại Học Bình Dương*, Vol. 6 No. 3, doi: [10.56097/binhduonguniversityjournalofscienceandtechnology.v6i3.165](https://doi.org/10.56097/binhduonguniversityjournalofscienceandtechnology.v6i3.165).
- Tolani, K., Manohar, S. and Rao, S. (2025), "Measuring sustainable mobility of electric vehicles: determining critical factors with policy mix support for developing economies and user convenience", *Journal of Innovation and Entrepreneurship*, Vol. 14 No. 1, p. 99, doi: [10.1186/s13731-025-00560-2](https://doi.org/10.1186/s13731-025-00560-2).
- Truelove, H.B., Carrico, A.R., Weber, E.U., Raimi, K.T. and Vandenberg, M.P. (2014), "Positive and negative spillover of pro-environmental behavior: an integrative review and theoretical framework", *Global Environmental Change*, Vol. 29, pp. 127-138, doi: [10.1016/j.gloenvcha.2014.09.004](https://doi.org/10.1016/j.gloenvcha.2014.09.004).
- United Nations Environment Programme (UNEP) (2024), *Sustainable Transport and Air Pollution, United Nations Environment Programme*, available at: <https://www.unep.org/explore-topics/resource-efficiency/what-we-do/cities/sustainable-transport-and-air-pollution> (accessed 27 October 2025).
- United States Department of Energy (2010), "Critical materials strategy"
- Van Tuan, P., Nguyen, H.T., Le, M.T. and Tran, Q.H. (2022), "Factors influencing purchasing intention toward electric vehicle in Vietnam", *Journal of Social Commerce*, Vol. 2 No. 2, pp. 82-99.
- Varshneya, G., Pandey, S.K. and Das, G. (2017), "Impact of social influence and green consumption values on purchase intention of organic clothing: a study on collectivist developing economy", *Global Business Review*, Vol. 18 No. 2, pp. 478-492, doi: [10.1177/0972150916668620](https://doi.org/10.1177/0972150916668620).
- Vermeir, I. and Verbeke, W. (2006), "Sustainable food consumption: exploring the consumer "attitude-behavioral intention" gap", *Journal of Agricultural and Environmental Ethics*, Vol. 19 No. 2, pp. 169-194, doi: [10.1007/s10806-005-5485-3](https://doi.org/10.1007/s10806-005-5485-3).
- Vilas, X. and Sabucedo, J.M. (2012), "Moral obligation: a forgotten dimension in the analysis of collective action", *International Journal of Social Psychology*, Vol. 27 No. 3, pp. 369-375, doi: [10.1174/021347412802845577](https://doi.org/10.1174/021347412802845577).
- Wang, J., Shen, M. and Chu, M. (2021), "Why is green consumption easier said than done? Exploring the green consumption attitude-intention gap in China with behavioral reasoning theory", *Cleaner and Responsible Consumption*, Vol. 2, 100015, doi: [10.1016/j.clrc.2021.100015](https://doi.org/10.1016/j.clrc.2021.100015).
- Wang, L., Zhang, Q. and Wong, P.P.W. (2022), "Purchase intention for green cars among Chinese millennials: merging the value-attitude-behavior theory and theory of planned behavior", *Frontiers in Psychology*, Vol. 13, 786292, doi: [10.3389/fpsyg.2022.786292](https://doi.org/10.3389/fpsyg.2022.786292).
- Wu, T.-L. and Liu, H.-T. (2023), "Causal model analysis of the effects of civil servants' perceived formalism, green conscientiousness, and moral reflectiveness on green behavior", *Sustainability*, Vol. 15 No. 7, p. 5772.
- Ye, N. and Zhou, M. (2012), "Exploring the attitude-action gap for new energy vehicle adoption", *East China Economic Management*, Vol. 11, pp. 135-137.
- Yong, N.L., Ariffin, S.K., Nee, G.Y. and Wahid, N.A. (2017), "A study of factors influencing consumer's purchase intention toward green vehicles: evidence from Malaysia", *Global Business and Management Research*, Vol. 9 No. 4s, pp. 281-297.

Yoo, B., Donthu, N. and Lee, S. (2000), "An examination of selected marketing mix elements and brand equity", *Journal of the Academy of Marketing Science*, Vol. 28 No. 2, pp. 195-211, doi: [10.1177/0092070300282002](https://doi.org/10.1177/0092070300282002).

Zheng, X., Menezes, F., Zheng, X. and Wu, C. (2022), "An empirical assessment of the impact of subsidies on EV adoption in China: a difference-in-differences approach", *Transportation Research Part A: Policy and Practice*, Vol. 162, pp. 121-136, doi: [10.1016/j.tra.2022.05.020](https://doi.org/10.1016/j.tra.2022.05.020).

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**Further reading**

Harland, P., Staats, H. and Wilke, H.A. (1999), "Explaining proenvironmental intention and behavior by personal norms and the theory of planned behavior", *Journal of Applied Social Psychology*, Vol. 29 No. 12, pp. 2505-2528, doi: [10.1111/j.1559-1816.1999.tb00123.x](https://doi.org/10.1111/j.1559-1816.1999.tb00123.x).

Parker, D., Manstead, A.S. and Stradling, S.G. (1995), "Extending the theory of planned behaviour: the role of personal norm", *British Journal of Social Psychology*, Vol. 34 No. 2, pp. 127-138, doi: [10.1111/j.2044-8309.1995.tb01053.x](https://doi.org/10.1111/j.2044-8309.1995.tb01053.x).

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