Analyzing the Drivers of Green Product Adoption in Bangkok, Thailand: A Focus on Electric Vehicles Transportation

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Abstract

This study investigates the drivers of green product adoption in Thailand, focusing on electric vehicle (EV) adoption as a key solution to reduce carbon emissions and enhance environmental sustainability. Grounded in the Technology Acceptance Model (TAM), the research examines how product information availability and persuasive advertising influence consumer attitudes and decision-making. Quantitative data were collected from 901 respondents across 21 districts in Bangkok, all with direct EV experience. Confirmatory Factor Analysis (CFA), multiple linear regression, and Structural Equation Modeling (SEM) were used for analysis. Results show that product information availability (β = 0.415***) and persuasive advertising (β = 0.502***) significantly and positively affect consumer decision-making. These relationships are mediated through key TAM constructs: product information availability influences perceived usefulness (β = 0.594***), perceived ease of use (β = 0.581***), and perceived risk (β = 0.448***), while persuasive advertising affects perceived usefulness (β = 0.689***), perceived ease of use (β = 0.685***), and perceived risk (β = 0.503***). The findings highlight the importance of information clarity, strategic communication, and supportive policy to accelerate EV adoption in Thailand.

Keywords: Electric Vehicles; Green Product Adoption; Consumer Behavior; Technology Acceptance Model; EV Adoption in Thailand

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Introduction

The global transition to electric vehicles (EVs) has gained significant momentum as nations seek solutions to reduce greenhouse gas emissions and reduce dependence on fossil fuels. This shift reflects a broader commitment to sustainability, driven by technological advancements, supportive government policies, and growing consumer awareness of environmental issues. EVs have emerged as a viable alternative to internal combustion engine vehicles, and their adoption has accelerated worldwide. In 2021, EVs accounted for approximately 4.6% of global vehicle sales, with countries like China, the United States, and Norway leading the way (International Energy Agency, 2021). Nations such as Norway have achieved EV penetration levels exceeding 80% of new car sales (International Energy Agency, 2023), a result of coordinated incentives, robust infrastructure, and widespread public acceptance.

Thailand, a major automotive manufacturing hub in Southeast Asia, is strategically positioning itself within this global transition. The Thai government has introduced several initiatives, including the Electric Vehicle Promotion Policy (EVPP), to stimulate EV adoption, expand charging infrastructure, and establish the country as a regional leader in electric mobility. Yet, actual consumer uptake has been comparatively modest. According to the Electric Vehicle Association of Thailand (Electric Vehicle Association of Thailand, 2023), while battery EV (BEV) registrations surged by 500% between 2021 and 2023, they still represent only about 1.5% of total passenger vehicle sales, a stark contrast to adoption levels in global EV leaders. This discrepancy between national ambition and consumer behavior highlights a fundamental challenge: many Thai consumers are still hesitant to transition to EVs despite increasing government support and market availability.

This research is grounded in the need to understand the underlying behavioral dynamics influencing EV adoption in Thailand. Thai consumers frequently cite concerns such as limited charging infrastructure, high upfront costs, and doubts about long-term vehicle performance (Limpasirisuwan et al., 2024). Additionally, consumer uncertainty is intensified by insufficient product information and ineffective advertising communication, which fail to address key questions or convey the practical benefits of EV ownership. In contrast, countries like China and the Netherlands have invested heavily in public education and targeted communication campaigns to boost awareness and trust in EV technologies (Funke et al., 2019; Wang et al., 2024).

This study applies the Technology Acceptance Model (TAM), originally developed by Davis (1989), to investigate Thai consumer attitudes and decision-making toward EVs. TAM focuses on perceived usefulness, ease of use, and risk; factors central to how individuals adopt new technologies. While widely applied in technology adoption research, its integration with marketing variables such as product information availability and persuasive advertising remains underexplored in the Thai EV context. This research seeks to bridge that gap by combining TAM with consumer-facing marketing constructs to create a more comprehensive model of EV adoption behavior.

Although previous studies in Thailand have emphasized infrastructural and policy-level drivers, few have explored the psychological and communication-related factors that shape buyer intent. In contrast, global case studies suggest that tailored consumer engagement strategies, backed by policy and industry, play a decisive role in encouraging adoption.

Thailand's path toward a low-emission transport future thus depends not only on technology and policy but also on informed, motivated, and confident consumers.

Accordingly, this study aims to examine how product information availability and persuasive advertising, alongside TAM constructs, influence Thai consumer behavior toward EV adoption. Specifically, the research has three objectives: (1) to evaluate the impact of product information, persuasive advertising, and TAM dimensions on consumer attitudes; (2) to analyze how these variables influence decision-making and behavioral intention; and (3) to develop a localized, integrated framework for promoting EV adoption in Thailand. By addressing the behavioral and informational gaps in the Thai market, this study provides insights for marketers, policymakers, and automakers to align their strategies with consumer expectations. It also extends the academic understanding of EV adoption in emerging markets and contributes to Thailand's broader environmental and mobility goals.

Literature Review

Electric vehicles (EVs) are increasingly recognized as eco-friendly alternatives to internal combustion engine vehicles, offering promising potential to reduce environmental degradation and dependency on fossil fuels. Globally, if the transportation sector were to transition entirely to EVs, carbon emissions could be reduced by as much as 11.9% (Ritchie et al., 2020). EVs emit no tailpipe pollutants, are energy efficient, and support quieter urban environments (U.S. Department of Energy & Office of Energy Efficiency and Renewable Energy, 2021). Despite these benefits, most empirical research on EV adoption is concentrated in advanced economies, while developing countries such as Thailand, currently pushing EVs as part of their environmental policy, remain underrepresented in academic discussions (Adnan et al., 2017; Wujin et al., 2019). A study by Tuan et al. (2022) in Vietnam and Hakam and Jumayla (2024) in Indonesia highlights that infrastructure gaps, affordability, and limited consumer awareness continue to slow down EV adoption across ASEAN markets.

The Thai government has introduced incentives and infrastructure development plans, yet adoption remains limited due to a variety of social, economic, and informational barriers. To understand how consumers make adoption decisions in this context, it is crucial to examine the role of information and persuasion in shaping perceptions and behavior. Moreover, while developed countries like Norway, Germany, and the U.S. benefit from mature EV ecosystems, developing nations face distinct challenges including price sensitivity, policy inconsistency, and cultural hesitation toward new technologies (International Energy Agency, 2023; Li et al., 2025). These differences suggest the need for regionally specific research models that account for behavioral, cultural, and infrastructural differences.

The Technology Acceptance Model (TAM), developed by Davis (1989), provides a valuable foundation for analyzing how consumers adopt new technologies. According to TAM, the two most critical determinants of technology adoption are perceived usefulness (PU) and perceived ease of use (PEOU). Perceived risk, although not part of the original TAM, has been integrated into extended models and is particularly relevant in the case of EVs, where uncertainty about battery life, charging infrastructure, and resale value still affects consumer confidence (Cocron et al., 2011; Hackbarth & Madlener, 2012).

Information and communication play a critical role in shaping these perceptions, especially in a market like Thailand where public understanding of EV technology is relatively low (Xu & Yang, 2021). Accurate and accessible product information can reduce cognitive

burden and perceived uncertainty, allowing consumers to better assess the utility and usability of EVs. Research shows that when consumers are informed about EV features; such as battery capacity, charging duration, energy efficiency, and maintenance costs, they are more likely to view EVs as useful and easy to adopt (Chen & Ma, 2024; Kim et al., 2019). This supports the view that product information availability positively influences the TAM constructs and, subsequently, consumer decision-making.

In Thailand, limited access to this kind of information creates informational asymmetries that hinder consumer trust and understanding. In contrast, countries like Norway have leveraged centralized information platforms to empower consumers, resulting in higher adoption rates (Yang et al., 2020). Similarly, Vietnam has adopted nationwide education campaigns to build consumer awareness, while Indonesia focuses on public-private partnerships to boost infrastructure confidence (Yuniza et al., 2021). Additionally, product information plays a role in reducing perceived risk. In emerging markets where EVs are less common, skepticism about battery reliability, resale value, and maintenance costs often dissuades potential buyers. When product information is lacking or inconsistent, consumers rely on assumptions or misinformation, which increases perceived risk and delays adoption decisions (Malek et al., 2020). Therefore, the availability of clear, consistent, and reliable product information is expected to significantly reduce perceived risk, while simultaneously improving perceptions of usefulness and ease of use. As such, this study hypothesizes that product information availability has a direct and indirect impact on consumer decision-making. Specifically, it is expected that product information will influence decision-making directly (H1), and indirectly through perceived usefulness (H3), perceived ease of use (H4), and perceived risk reduction (H5).

Another crucial variable influencing EV adoption is persuasive advertising, which refers to marketing communications designed to influence attitudes and behaviors by appealing to consumers' emotions, logic, or perceptions of credibility. Romanova and Smirnova (2019) highlight that effective persuasive advertising utilizes three main strategies: emotional (pathos), logical (logos), and credibility-based (ethos) appeals. Each of these appeals can be aligned with constructs from the TAM framework.

Emotional appeals, for example, can increase the perceived usefulness of EVs by framing them as essential to protecting the environment and ensuring public health, values that resonate strongly with many Thai consumers who are increasingly concerned about air pollution and climate change (Singh & Paul, 2023). Similarly, advertisements that present EVs as modern, responsible, and innovative technologies can boost perceived ease of use by suggesting that EVs are intuitive, reliable, and supported by modern infrastructure. Such messaging reduces psychological barriers to trial and adoption (Soltani-Sobh et al., 2015).

Credibility-based advertising, using endorsements by experts, organizations, or public figures, also supports consumer trust. In Thailand, where unfamiliarity with EVs persists, endorsements from environmental agencies or respected local personalities can reduce perceived risk and build positive attitudes toward EVs (Balaskas, 2023; Mohr & Nevin, 1990). Similar approaches have been used in countries like Malaysia, where public service campaigns and expert-led advertising increased EV trial rates (Rahman et al., 2014). In developed economies, national EV adoption strategies are often supported by broad media campaigns aimed at reshaping social norms around green mobility (Chen & Ma, 2024).

In the Thai context, culturally attuned campaigns that highlight the ethical, financial, and ecological value of EVs are likely to be effective in increasing both intention and behavior.

The theoretical logic underpinning these assertions suggests that persuasive advertising positively influences EV decision-making directly (H2), and indirectly via perceived usefulness (H6), perceived ease of use (H7), and perceived risk reduction (H8).

These theoretical developments draw from both technology acceptance theory and marketing communication literature, highlighting the interplay between cognitive, affective, and behavioral drivers. This integrated framework addresses a major gap in the literature on EV adoption in Thailand, where marketing efforts have yet to be systematically examined in relation to consumer psychology. While TAM has been widely applied in developed economies, this study's application in an ASEAN context, combined with marketing communication variables, offers a regionally relevant adaptation that accounts for socio-cultural nuances and infrastructure differences. By developing each hypothesis based on TAM constructs and marketing theory, this study provides a comprehensive foundation to empirically test the influence of product information and persuasive advertising on consumer decision-making regarding EV adoption in the Thai context. See figure 1 below.

Research Methodology

This study employed a quantitative research design to investigate factors influencing electric vehicle (EV) adoption among consumers in Bangkok, Thailand. The quantitative approach was chosen as it enables the collection of measurable, generalizable data using structured instruments and the application of statistical methods to test hypotheses regarding the relationships between key variables. The target population consisted of Bangkok residents who are potential or current users of electric vehicles. Stratified random sampling was used to ensure proportional representation across the city's diverse demographics. Bangkok's 21 main districts served as the strata, with the stratification based on population data from the Thai Statistical Office as of 2023. Each district's sample size was determined according to its proportion relative to the total city population of 5,476,829. For instance, Chatuchak, with the highest district population, contributed a larger share of respondents, while smaller districts like Samphanthawong contributed fewer. The sample size was initially determined using Collier (2020) rule, which recommended multiplying the number of observed variables (47) by 15 to obtain the minimum sample size for Structural Equation Modeling (SEM), resulting in a target of 705. However, to increase statistical power, account for potential non-responses, and improve representativeness, a total of 901 valid responses were collected and analyzed.

Data were gathered using a structured questionnaire that was distributed through online surveys via Google Forms across the 21 districts. This mixed-mode approach ensured broad participation and demographic representation. Participants were fully informed about the study's objectives, the voluntary nature of their participation, and the confidentiality of their responses. The collected data were analyzed using a range of statistical methods, including descriptive statistics, correlation analysis, regression analysis, and Structural Equation Modeling (SEM) with Confirmatory Factor Analysis (CFA), which were selected for their suitability in testing hypothesized relationships between key variables. SEM and CFA were employed to assess the overall model fit and evaluate both direct and indirect effects in the study's theoretical model. For SEM analysis, AMOS 26.0 software was used. To ensure the validity and reliability of the model, various statistical tests were conducted. CFA was performed to evaluate construct validity, using criteria such as standardized factor loadings greater than 0.5, Average Variance Extracted (AVE) above 0.5, and Composite Reliability (CR) greater than 0.7, following Hair et al. (2010). Internal consistency was assessed using

Cronbach's Alpha, with all constructs exceeding the threshold of 0.7. The Kolmogorov-Smirnov test was used to verify the normality of the data, ensuring its suitability for parametric testing. Multicollinearity was checked by examining the Variance Inflation Factor (VIF), ensuring that the predictors in regression models were not highly correlated, with a VIF threshold of less than 5. All validity and reliability statistics are reported in the results section, with clear thresholds and references used for interpretation.

Research Findings

This study surveyed 901 participants in Bangkok to explore factors driving electric vehicle (EV) adoption in Thailand. The sample included a broad age range, with 16.2% aged 18 to 24, 17% between 25 and 34, 28.4% between 35 and 44, 28.7% between 45 and 54, and 9.7% aged 55 or older. Females made up 58.5% of respondents, while males accounted for 39.2%. Educational attainment was relatively high, with over 65% holding at least a bachelor's degree, including 33.7% with a master's and 22.9% with a doctorate. Monthly income varied, mostly falling between 10,000 and 40,000 Thai Baht, with the largest group (39.5%) earning 36,000 to 40,000 Baht. Notably, 73% of respondents had some exposure to EVs through ownership, rental, test-driving, or riding, indicating a substantial level of familiarity with the technology.

Regarding the key drivers of EV adoption, the Technology Acceptance Model (TAM) emerged as the most significant, with mean agreement scores between 4.49 and 4.18, reflecting strong consensus that perceived usefulness, ease of use, and perceived risk influence adoption decisions. Consumer decision-making factors also showed high agreement (means ranging from 4.40 to 3.84), highlighting the influence of social networks and digital platforms in shaping consumer attitudes. Product information availability received mixed but generally positive ratings, ranging from 4.41 to 2.13, with particular emphasis on environmental benefits and government incentives, though some variation in information accessibility was evident. Persuasive advertising had the lowest agreement levels (means between 4.36 and 3.25), with consumers responding more favorably to practical messages around health and safety than to emotional appeals related to environmental responsibility.

Initial analysis revealed some issues with reliability and validity in the measurement model, with Cronbach's Alpha and Composite Reliability values below acceptable levels. After removing weak items, the revised model demonstrated improved reliability and validity, confirmed by satisfactory fit indices in Confirmatory Factor Analysis. All tested hypotheses were supported, highlighting the importance of these factors in driving EV adoption in Thailand. These findings suggest that improving information accessibility, tailoring advertising to consumer values, addressing perceived technological risks, and leveraging social influence are key strategies to accelerate the adoption of electric vehicles in the Thai market.

Discussion

The statistical robustness of this study, evidenced by model fit indices such as X^2/df = 2.038 (Kline, 2023), GFI = 0.929 (Schermelleh-Engel et al., 2023), CFI = 0.912 (Bentler, 1990), and RMSEA = 0.034 (Pedroso et al., 2016; Xia & Yang, 2019), reflects a strong alignment between the proposed factors and consumer attitudes toward EVs in Thailand. Product information availability (PIA) played a particularly influential role, with key variables such as PIA8 (λ = 0.46) and PIA9 (λ = 0.41) emphasizing environmental impact and

government incentives. These findings are consistent with Yang et al. (2020), who emphasizes the role of accessible product information in driving EV adoption, but they differ from contexts such as Norway or Germany, where environmental literacy and policy clarity are already high, suggesting that Thai consumers face a relatively higher information barrier.

Persuasive advertising (PAD) also showed selective effectiveness. While variables like PAD1 ($\lambda = 0.40$) and PAD11 ($\lambda = 0.51$); focused on health, safety, and corporate responsibility, had a meaningful impact, emotional appeals such as PAD2 and PAD3 were less influential. This contrasts with patterns in countries like Sweden and Canada, where emotional and environmental messaging more strongly motivates pro-environmental behavior (Chaffey & Ellis-Chadwick, 2019). Thai consumers may therefore respond more positively to practical advertising content aligned with tangible social benefits, rather than generalized environmental responsibility.

The Technology Acceptance Model (TAM) showed consistent explanatory power across contexts. In Thailand, all 14 observed variables were significant ($\lambda = 0.40–0.61$), particularly perceived usefulness (e.g., TAM9 at $\lambda = 0.60$) and ease of use (e.g., TAM4 at $\lambda = 0.51$), supporting the findings of Higueras-Castillo et al. (2023). These patterns align with international research in markets such as China, the U.S., and South Korea. However, perceived risk; especially concerning long-term technological reliability, remains a more substantial barrier in Thailand, consistent with Malek et al. (2020), and reflecting challenges seen in developing EV ecosystems with less mature charging infrastructure and maintenance networks.

Lastly, consumer decision-making (CDM) in Thailand is significantly influenced by digital platforms and social networks. CDM2 ($\lambda = 0.40$) highlights the role of online resources, while CDM7 ($\lambda = 0.69$) underlines the importance of family and peer influence. This mirrors adoption behavior in collectivist societies such as China and Indonesia (Boztepe, 2016; Dholakia et al., 2009), whereas in more individualistic contexts like the U.S. or U.K., decisions tend to rely more on self-guided research and personal values (Dessart & Pitardi, 2019). These cultural distinctions further emphasize the need for Thailand's EV policy and marketing strategies to consider the social dimensions of influence, in addition to technology and product-related factors.

Hypothesis Testing and Results

The second objective of this study was to examine the influence of product information availability, persuasive advertising, and the technology acceptance model (TAM) on consumer decision-making regarding the adoption of electric vehicles (EVs) in Thailand. Structural equation modeling was used to test eight hypotheses, exploring both direct and mediating effects on consumer decisions. The results provided strong support for the hypotheses, revealing that product information availability and persuasive advertising positively influenced consumer decision-making.

H1: Product Information Availability Directly Affects Customer Decision-Making

Product information availability positively influenced customer decision-making ($\beta = 0.415$***), with significant loadings for individual measurement items, including PIA2 ($\lambda = 0.52$), PIA4 ($\lambda = 0.48$), PIA6 ($\lambda = 0.44$), PIA7 ($\lambda = 0.40$), PIA8 ($\lambda = 0.46$), PIA9 ($\lambda = 0.41$), and PIA10 ($\lambda = 0.46$). The hypothesis was supported with a p-value less than 0.001 (***$p < 0.001$). These findings support prior research (e.g., Yang et al., 2020) that highlights the importance of detailed product information in reducing uncertainty and improving consumer decision-making. In Thailand, the availability of clear product information on EVs, such as

environmental benefits, incentives, and charging infrastructure, boosts consumers' confidence and encourages EV adoption.

H2: Persuasive Advertising Influences Customer Decision-Making

Persuasive advertising positively impacted consumer decision-making (β = 0.502***), with a p-value less than 0.001 (***p < 0.001). This supports findings from Romanova and Smirnova (2019), which suggest that persuasive advertising shapes consumer perceptions, preferences, and adoption behavior. In Thailand, advertisements emphasizing EVs' environmental and cost benefits are especially effective in driving consumer decisions.

H3: Product Information Availability Influences Customer Decision-Making Through Perceived Usefulness

Product information availability positively influenced consumer decision-making through perceived usefulness (β = 0.594***), with a significant p-value of less than 0.001 (***p < 0.001). This result aligns with Coffman et al., (2016), who argue that clear information on the long-term financial and environmental benefits of EVs increases their perceived usefulness. By providing easy access to these advantages, accessible product information enhances EV adoption rates.

H4: Product Information Availability Influences Customer Decision-Making Through Perceived Ease of Use

Product information availability positively influenced decision-making through perceived ease of use (β = 0.581***), with a significant p-value of less than 0.001 (***p < 0.001). This finding suggests that consumers who understand how to use EVs, thanks to clear information, are more likely to perceive them as user-friendly, thereby increasing the likelihood of adoption (Axsen et al., 2016).

H5: Product Information Availability Impacts Customer Decision-Making Through Perceived Risk and Uncertainties

Product information availability positively affected decision-making through perceived risk and uncertainties (β = 0.448***), with a significant p-value of less than 0.001 (***p < 0.001). This supports the findings of Malek et al. (2020), who emphasize that clear, accurate information reduces consumer uncertainty. In Thailand, addressing concerns about EV pricing, government incentives, and charging infrastructure helps alleviate the perceived risks of adopting EVs.

H6: Persuasive Advertising Influences Customer Decision-Making Through Perceived Usefulness

Persuasive advertising positively influenced decision-making through perceived usefulness (β = 0.689***), with a significant p-value of less than 0.001 (***p < 0.001). Advertisements that highlight the practical benefits of EVs, such as cost savings and environmental impact, help increase their perceived value and influence purchasing decisions (Bryla et al., 2022).

H7: Persuasive Advertising Influences Customer Decision-Making Through Perceived Ease of Use

Persuasive advertising positively influenced decision-making through perceived ease of use (β = 0.685***), with a significant p-value of less than 0.001 (***p < 0.001). Advertisements emphasizing the user-friendliness of EV features, such as intuitive charging instructions and simplified maintenance, help improve perceptions of ease of use, positively influencing consumer decisions.

H8: Persuasive Advertising Influences Customer Decision-Making Through Perceived Risk and Uncertainties

Persuasive advertising positively influenced decision-making through perceived risk and uncertainties (β = 0.503***), with a significant p-value of less than 0.001 (***p < 0.001). This finding suggests that advertisements addressing concerns about EVs; such as range anxiety, battery durability, and charging infrastructure, can reduce consumer uncertainty and support adoption (Chaffey & Ellis-Chadwick, 2019).

The results of hypothesis testing indicate that both product information availability and persuasive advertising have significant direct and indirect effects on consumer decision-making regarding EV adoption in Thailand. These factors influence decision-making through key mediators such as perceived usefulness, ease of use, and perceived risk. The study provides valuable insights into the role of information and advertising in promoting EV adoption, particularly in emerging markets. The findings suggest that to encourage EV adoption in Thailand, efforts should focus on improving access to detailed product information and leveraging persuasive advertising strategies that highlight the environmental and financial benefits of EVs. Additionally, promoting ease of use and addressing perceived risks in both information and advertising campaigns could significantly enhance consumer confidence and adoption rates.

Structural Equation Modelling (SEM)

Structural Equation Modeling (SEM), which precedes the Confirmatory Factor Analysis (CFA) model, was employed to create a comprehensive hypothesized model, or the main conceptual model for this research. The AMOS software, version 24.0, was utilized successfully to obtain the Maximum Likelihood Estimation (MLE) to ensure its suitability with the data gathered earlier regarding the Drivers of Green Product Adoption in Thailand: A Focus on Electric Vehicles Transportation. The analysis included Goodness of fit measures to assess the precision and acceptability levels of the model during this evaluation.

The hypothesized relationships existing among the model construct were described in a structural model, grouped into three (3), thus, **independent variables** (Product Information Availability – PIA2, PIA4, PIA6, PIA7, PIA8, PIA9, PIA10), (Persuasive Advertising – PAD1, PAD3, PAD4, PAD5, PAD6, PAD7, PAD8, PAD9, PAD10, PAD11); **mediators** derived originally from TAM – Technology Acceptance Model but spread among three distinct elements (Perceived Usefulness – PU, Perceived Ease of Use – PEU, and Perceived Risk and Uncertainties – PRU). However, for better clarity in relation to the questionnaire/survey item, PU was associated to TAM1, TAM2, TAM3, TAM4, TAM5, TAM6; PEU was associated to TAM7, TAM8, TAM9, TAM10, TAM11; while PRU was associated to TAM12, TAM13, TAM14; **dependent variable** (Consumer Decision Making - CDM). Based on the foregoing, after much satisfaction was obtained from the measurement model, all nine (9) hypotheses associated to the model were tested, thereby resulting to a working conceptual framework. See the figure 2 below.

Table 1 offers a recap of the structural paths found in the model, as well as the outcomes of the hypothesis evaluations and the related standardized estimates derived from a sample of 901 participants. This table gives a clear summary of the main results from the structural equation modeling analysis, enabling readers to evaluate the accuracy of the hypotheses and the connections among the variables in the research.

Theoretical Contributions

This article contributes significantly to the academic field by shedding light on the factors that influence electric vehicle (EV) adoption in Thailand. The research integrates established frameworks, such as the Technology Acceptance Model (TAM), and applies them to a contemporary issue, thus advancing knowledge in the fields of consumer behavior, technology adoption, and sustainability. Specifically, the study introduces new insights into how product information availability, persuasive advertising, and social influence impact consumer decision-making, particularly in the context of EVs. It also explores the indirect effects of these drivers, highlighting the complex relationships between these factors and the actual adoption of electric vehicles. The study adds to the body of literature by incorporating mediating variables like perceived ease of use and perceived risk, offering a more nuanced understanding of how these factors shape consumer attitudes toward EVs. This research is valuable not only for its theoretical contribution but also for its practical implications in terms of marketing, policy-making, and environmental sustainability. By focusing on the Thai market, it provides a case study that can be applied to other emerging markets where EV adoption is still in its early stages, thus expanding the generalizability of existing theories in technology acceptance and adoption.

Managerial Implications

From a social and economic perspective, this research offers significant implications for enhancing Thailand's position in the rapidly expanding global electric vehicle (EV) industry. By identifying key drivers of EV adoption, such as improved product information, targeted marketing strategies, and infrastructure development, the study provides actionable recommendations for accelerating EV uptake. These insights are particularly valuable for key stakeholders including government agencies, automotive manufacturers, energy providers, and advertising firms.

Crucially, the study supports Thailand's efforts to become not only a consumer of EV technology but also a regional leader in EV manufacturing and adoption. By applying the research findings, policymakers can design more effective incentive programs, such as tax reductions, purchase subsidies, and nationwide charging networks, that attract both domestic and foreign investment into the green mobility sector. This, in turn, could create high-skilled jobs, stimulate innovation, and promote industrial growth.

Moreover, the research highlights how private sector actors can tailor their marketing messages to address consumer priorities such as cost savings, convenience, and environmental responsibility. Such alignment between consumer needs and business strategies is essential for scaling EV demand and building consumer trust. In doing so, Thailand can improve its environmental performance, reducing carbon emissions and enhancing urban air quality, while also advancing economic development.

Finally, these findings support Thailand's long-term sustainability goals and strengthen its potential to lead the ASEAN region in green technology innovation, EV production, and environmentally conscious transport solutions.

Conclusion

This study examined eight hypotheses to explore the key factors influencing electric vehicle (EV) adoption in Thailand, with a focus on product information availability, persuasive advertising, the Technology Acceptance Model (TAM), and consumer decision-making behavior. The qualitative findings revealed that accessible and transparent product information significantly enhances consumer confidence. Respondents emphasized that effective communication; especially regarding cost, performance, and environmental benefits, is essential in promoting EV adoption.

Quantitative results supported these insights. Product information highlighting cost-effective features of EVs demonstrated the strongest influence within its category, with a factor loading (λ) of 0.52. Persuasive advertising also emerged as a critical driver, particularly when emphasizing performance comparisons between EVs and traditional gasoline vehicles (λ = 0.54). These findings reinforce the importance of targeted marketing strategies that align with consumer priorities. Within the TAM framework, the variable "lower operational costs" had the highest loading (λ = 0.53) under perceived usefulness, indicating that financial benefits are a strong motivator. The "easy transition to EVs" (λ = 0.61) ranked highest under perceived ease of use, suggesting that user-friendly experiences can facilitate greater acceptance. However, concerns around perceived risks, particularly battery life and replacement costs; persist, with this variable holding the highest factor loading (λ = 0.44) in that category.

In terms of consumer decision-making, "influence of online reviews and ratings" (λ = 0.71) ranked highest, illustrating the substantial role digital platforms play in shaping consumer behavior and trust. These results indicate that consumer preferences are shaped by a mix of rational evaluations and emotional considerations, with environmental consciousness, technological confidence, and financial feasibility all playing varying roles.

In conclusion, a multifaceted strategy that combines clear and cost-focused product information, persuasive advertising, user-oriented design, and strong digital engagement is essential for advancing EV adoption in Thailand. Understanding and addressing the diverse motivations and concerns of consumers will allow stakeholders, policymakers, marketers, and manufacturers, to better tailor their efforts to promote widespread EV acceptance in the Thai market. See figure 3 below.

Brief Summary

This study explores factors driving electric vehicle (EV) adoption in Thailand, using the Technology Acceptance Model (TAM). Based on data from 901 EV users in Bangkok, the research finds that both product information availability and persuasive advertising significantly enhance consumer decision-making. These effects are mediated by perceptions of usefulness, ease of use, and risk. The study underscores the importance of clear information, effective communication, and supportive policies to promote green product adoption and environmental sustainability in Thailand.

Limitations and Directions of Future Research

Building on this study's findings, future research should explore the dynamic interplay of emerging technologies, consumer behavior, and policy evolution in accelerating electric vehicle (EV) adoption in Thailand. As technological innovation progresses, examining the impact of next-generation battery technologies; such as solid-state batteries, ultra-fast charging,

and second-life battery applications, could provide valuable insights into how these advancements shape consumer perceptions of convenience, cost, and environmental value.

Artificial intelligence (AI) and data analytics also present promising avenues for exploration. AI can enhance targeted marketing by tailoring persuasive messages based on individual behavior patterns and preferences. Additionally, AI-driven infrastructure planning, such as demand prediction and smart grid integration, may improve the efficiency and accessibility of EV charging networks. Understanding the feasibility and consumer acceptance of these innovations in the Thai context will be crucial for effective implementation.

Future studies should also investigate the role of social and cultural dynamics in shaping EV adoption. Longitudinal research can track generational shifts in attitudes, while behavioral economics concepts, such as loss aversion and habit formation, may offer deeper understanding of consumer resistance or willingness to transition to EVs.

Policy analysis remains essential. Comparative studies between Thailand and leading EV markets like Norway and China could identify effective strategies in infrastructure investment, financial incentives, and regulatory frameworks. Exploring regional disparities, particularly the challenges faced in rural areas, such as limited charging access, can guide equitable policy development. Finally, integrating EVs into Thailand's broader sustainability goals, such as renewable energy alignment, carbon reduction, and green manufacturing, should be a priority. Research into decentralized charging networks, solar-powered infrastructure, and circular economy practices will help ensure that EV adoption contributes meaningfully to environmental and economic objectives.

References

Adnan, N., Nordin, S. M., Rahman, I., & Rasli, A. M. (2017). A new era of sustainable transport: An experimental examination on forecasting adoption behavior of EVs among Malaysian consumers. *Transportation Research Part A: Policy and Practice, 103*, 279–295. https://doi.org/10.1016/j.tra.2017.07.003

Axsen, J., Goldberg, S., & Bailey, J. (2016). How might potential future plug-in electric vehicle buyers differ from current 'Pioneer' owners?. *Transportation Research Part D: Transport and Environment, 47*, 357–370. https://doi.org/10.1016/j.trd.2016.05.015

Balaskas, S., Panagiotarou, A., & Rigou, M. (2023). Impact of environmental concern, emotional appeals, and attitude toward the advertisement on the intention to buy green products: The case of younger consumer audiences. *Sustainability*, *15*(17), 13204. https://doi.org/10.3390/su151713204

Bentler, P. M. (1990). Comparative fit indexes in structural models. *Psychological Bulletin, 107*(2), 238–246. https://doi.org/10.1037/0033-2909.107.2.238

Boztepe, A. (2016). Green marketing and its impact on consumer buying behavior. *European Journal of Economic and Political Studies*, *5*(1), 5–21.

Bryła, P., Chatterjee, S., & Ciabiada-Bryła, B. (2022). The impact of social media marketing on consumer engagement in sustainable consumption: A systematic literature review. *International Journal of Environmental Research and Public Health*, *19*(24), 1–16. https://doi.org/10.3390/ijerph192413405

Chaffey, D., & Ellis-Chadwick, F. (2019). *Digital marketing: Strategy and implementation* (7th ed.). Pearson Education.

Chen, L., & Ma, R. (2024). Clean energy synergy with electric vehicles: Insights into carbon footprint. *Energy Strategy Reviews, 53*, 101394. https://doi.org/10.1016/j.esr.2024.101394

Chu, W., Im, M., Song, M., & Park, J. (2019). Psychological and behavioral factors affecting electric vehicle adoption and satisfaction: A comparative study of early adopters in China and Korea. *Transportation Research Part D: Transport and Environment, 76*, 1–18. https://doi.org/10.1016/j.trd.2019.09.009

Coffman, M., Bernstein, P., & Wee, S. (2016). Electric vehicles revisited: A review of factors that affect adoption. *Transport Reviews, 37*(1), 1–15. https://doi.org/10.1080/01441647.2016.1217282

Cocron, P., Schmalfuß, F., Kreißig, I., Franke, T., Krems, J., Schwalm, M., & Keinath, A. (2011). Methods of evaluating electric vehicles from a user's perspective – The MINI E field trial in Berlin. *IET Intelligent Transport Systems, 5*, 127–133. https://doi.org/10.1049/iet-its.2010.0126

Collier, J. E. (2020). *Applied structural equation modeling using AMOS: Basic to advanced techniques*. Routledge. https://doi.org/10.4324/9781003018414

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly, 13*(3), 319–340.

Dessart, L., & Pitardi, V. (2019). How stories generate consumer engagement: An exploratory study. *Journal of Business Research, 104*, 183–195. https://doi.org/10.1016/j.jbusres.2019.07.007

Dholakia, U., Kahn, B., Reeves, R., Rindfleisch, A., Stewart, D., & Taylor, E. (2009). Consumer behavior in a multichannel, multimedia retailing environment. *Journal of Interactive Marketing*, *24*(2), 86–95. https://doi.org/10.1016/j.intmar.2010.02.005

Electric Vehicle Association of Thailand. (2023). *Seventh International Electric Vehicle Technology Conference and Exhibition (iEVTech 2023).* https://evat.or.th/iev-tech/2023/2023

Fauzan, I. T. D. M. F., Feng, S., Zureel, M., Sinidol, B., Wong, D., & Jian, G. (2019). A review on challenges and opportunities of electric vehicles (EVs). *Journal of Mechanical Engineering Research & Developments, 42*, 130–137. https://doi.org/10.26480/jmerd.04.2019.130.137

Funke, S. Á., Sprei, F., Gnann, T., & Plötz, P. (2019). How much charging infrastructure do electric vehicles need? A review of the evidence and international comparison. *Transportation Research Part D: Transport and Environment, 77*, 224–242. https://doi.org/10.1016/j.trd.2019.10.024

Hackbarth, A., & Madlener, R. (2012). Consumer preferences for alternative fuel vehicles: A discrete choice analysis (Revised December 2012) (*FCN Working Paper No. 20/2011*). SSRN. https://ssrn.com/abstract=2236286

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). *Multivariate data analysis* (7th ed.). Pearson.

Hakam, D., & Jumayla, S. (2024). Electric vehicle adoption in Indonesia: Lesson learned from developed and developing countries. *Sustainable Futures, 8*, 100348. https://doi.org/10.1016/j.sftr.2024.100348

Higueras-Castillo, E., Singh, V., Singh, V., & Liébana-Cabanillas, F. (2023). Factors affecting adoption intention of electric vehicle: A cross-cultural study. Environment, Development and Sustainability. (Advance online publication). https://doi.org/10.1007/s10668-023-03865-y

International Energy Agency. (2021). *World energy outlook 2021*. https://www.iea.org/reports/world-energy-outlook-2021

International Energy Agency. (2023). *Global EV outlook 2023: Catching up with climate ambitions*. https://www.iea.org/reports/global-ev-outlook-2023

Kim, J. H., Lee, G., Park, J. Y., Hong, J., & Park, J. (2019). Consumer intentions to purchase battery electric vehicles in Korea. *Energy Policy*, *132*, 736–743. https://doi.org/10.1016/j.enpol.2019.06.039

Kline, R. B. (2023). Structural equation modeling in neuropsychology research. In G. G. Brown, B. Crosson, K. Y. Haaland, & T. Z. King (Eds.), *APA handbook of neuropsychology: Neuroscience and neuromethods* (pp. 681–698). American Psychological Association. https://doi.org/10.1037/0000308-034

Kotler, P., Armstrong, G., Wong, V., & Saunders, J. A. (2010). *Principles of marketing* (pp. 613–627). Pearson Education; Prentice Hall.

Li, B., Chu, Y. Y., & Huang, E. (2025). A study of electric vehicles (EV) purchase intention: The perspective of sustainability. *Journal of China-ASEAN Studies*, *5*(2), 67–84. https://so07.tci-thaijo.org/index.php/JCAS/article/view/7999

Limpasirisuwan, N., Champahom, T., Jomnonkwao, S., & Ratanavaraha, V. (2024). Promoting sustainable transportation: Factors influencing battery electric vehicle adoption across age groups in Thailand. *Sustainability, 16*(21), 9273. https://doi.org/10.3390/su16219273

Mandys, F. (2021). Electric vehicles and consumer choices. *Renewable and Sustainable Energy Reviews, 142*, 110874. https://doi.org/10.1016/j.rser.2021.110874

Malek, M., Al-Majali, S., & Almajali, M. (2020). Influence of perceived risk dimensions on consumers' attitudes towards buying electric vehicles (EVs) in Jordan. *Jordan Journal of Business Administration, 16*(2), 445-472.

Marsh, H. W., Hau, K. T., & Wen, Z. (2004). In search of golden rules: Comment on hypothesis-testing approaches to setting cutoff values for fit indexes and dangers in overgeneralizing Hu and Bentler's (1999) findings. *Structural Equation Modeling: A Multidisciplinary Journal, 11*(3), 320–341. https://doi.org/10.1207/s15328007sem1103_2

Mohr, J., & Nevin, J. R. (1990). Communication strategies in marketing channels: A theoretical perspective. *Journal of Marketing, 54*(4), 36–51. https://doi.org/10.2307/1251758

Panwar, D., Anand, S., Ali, F., & Singal, K. (2019). Consumer decision making process models and their applications to market strategy. *International Management Review, 15*, 36–42.

Pedroso, R., Zanetello, L., Guimarães, L., Pettenon, M., Gonçalves, V., Scherer, J., Kessler, F., & Pechansky, F. (2016). Confirmatory factor analysis (CFA) of the Crack Use Relapse Scale (CURS). *Archives of Clinical Psychiatry (São Paulo)*, *43*, 37–40. https://doi.org/10.1590/0101-60830000000081

Rahman, M. A., Afroz, R., & Alam, Z. (2014). Development of electric vehicle: Public perception and attitude, the Malaysian approach. *World Review of Intermodal Transportation Research, 5*, 149–165.

Ritchie, H., Rosado, P., & Roser, M. (2020). *Greenhouse gas emissions*. OurWorldInData.org. https://ourworldindata.org/greenhouse-gas-emissions

Romanova, I., & Smirnova, I. (2019). Persuasive techniques in advertising. *Training Language and Culture, 3*, 55–70. https://doi.org/10.29366/2019tlc.3.2.4

Schermelleh-Engel, K., Moosbrugger, H., & Müller, H. (2003). Evaluating the fit of structural equation models: Tests of significance and descriptive goodness-of-fit measures. *Methods of Psychological Research, 8*(2), 23–74.

Schreiber, J. B., Nora, A., Stage, F. K., Barlow, E. A., & King, J. (2006). Reporting structural equation modeling and confirmatory factor analysis results: A review. *The Journal of Educational Research, 99*(6), 323–338. https://doi.org/10.3200/JOER.99.6.323-338

Singh, D., & Paul, U. K. (2023). Impact of awareness on the adoption of electric vehicles: A systematic literature review. In R. Sharma, A. Shishodia, & A. Gupta (Eds.), *Fostering sustainable development in the age of technologies* (pp. 331–357). Emerald Publishing. https://doi.org/10.1108/978-1-83753-060-120231023

Soltani-Sobh, A., Heaslip, K., Bosworth, R., Barnes, R., & Yook, D. (2015). Investigating factors affecting electric vehicles adoption: An aggregated panel data analysis over U.S. states. *World Electric Vehicle Journal, 7*(4), 681–691. https://doi.org/10.3390/wevj7040681

Tuan, P., Thao, N., Linh, L., Le, T., & Linh, N. (2022). Factors influencing purchasing intention toward electric vehicle in Vietnam. *Journal of Social Commerce, 2*(2), 82–99. https://doi.org/10.56209/jommerce.v2i2.30

U.S. Department of Energy. (2021). Federal tax credits for all-electric and plug-in hybrid vehicles. https://afdc.energy.gov/laws/409

Varpio, L. (2018). Using rhetorical appeals to credibility, logic, and emotions to increase your persuasiveness. *Perspectives on Medical Education, 7*, 230–234. https://doi.org/10.1007/s40037-018-0420-2

Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Management Science, 46*(2), 186–204. https://doi.org/10.1287/mnsc.46.2.186.11926

Vrtana, D., & Krizanova, A. (2023). The power of emotional advertising appeals: Examining their influence on consumer purchasing behavior and brand–customer relationship. *Sustainability, 15*(18), 1–18. https://doi.org/10.3390/su151810000

Wang, D., Ozden, M., & Tsang, Y. P. (2024). The impact of facilitating conditions on electric vehicle adoption intention in China: An integrated unified theory of acceptance and use of technology model. *International Journal of Engineering Business Management, 15*. https://doi.org/10.1177/18479790231224715

Xia, Y., & Yang, Y. (2019). RMSEA, CFI, and TLI in structural equation modeling with ordered categorical data: The story they tell depends on the estimation methods. *Behavior Research Methods, 51*(1), 409–428. https://doi.org/10.3758/s13428-018-1055-2

Xu, Z., & Yang, H. (2021). Perceived product innovation and consumers' intentions to adopt electric vehicles. *Environmental Science and Pollution Research, 28*, 2638–2647. https://doi.org/10.1007/s11356-020-11085-3

Yang, F., Xie, Y., & Sui, X. (2020). Marketing approach for the promotion of electric vehicles in the market: Evidence from China. *Sustainable Energy Technologies and Assessments, 38*, 100600. https://doi.org/10.1016/j.seta.2020.100600

Yuniza, M., Pratama, I., & Ramadhaniati, R. (2021). Indonesia's incentive policies on electric vehicles: The questionable effort from the government. *International Journal of Energy Economics and Policy*, *11*(5), 434–440. https://doi.org/10.32479/ijeep.11453

Appendix

Table 1: Summary of Structural Paths and Hypothesis Results/Standard Estimates (n=901)

H	From	TO		Hypothesis model		
				Standardized regression weight: estimate	Z	P
H1	PIA	CDM		0.415***	10.721	0.000
H2	PAD	CDM		0.502***	6.523	0.000
H3	PIA	PU	CDM	0.594***	16.83	0.000
H4	PIA	PEU	CDM	0.581***	9.855	0.000
H5	PIA	PRU	CDM	0.448***	17.80	0.000
H6	PAD	PU	CDM	0.685***	11.80	0.000
H7	PAD	PEU	CDM	0.685***	4.358	0.000
H8	PAD	PRU	CDM	0.503***	17.44	0.000

Model goodness-of-fit statistics	Acceptable levels Criteria	Hypothesis model
Chi-square statistic	_	1355.230
Df	>0	665
CMINDF	<3	2.038
p-value	>0.05	p=0.000
GFI	>0.90	0.929
AGFI	> 0.80	0.917
RMR	< 0.05	0.041
RMSEA	< 0.05	0.034
CFI	>0.90	0.912
IFI	>0.90	0.913
NFI	>0.90	0.842
TLI	>0.90	0.902

Notes: *p<0.05, **p<0.01, ***p<0.001

A structural equation modeling (SEM) analysis revealed a chi-square value of 1355.230 (df = 665, $p < 0.001$), indicating a statistically significant model with degrees of freedom sufficient to assess fit. The relative chi-square (CMIN/DF = 2.038) falls within the acceptable threshold of ≤3, as recommended by Kline (2023), indicating an adequate model fit. Additional fit indices further support this conclusion: CFI = 0.912, IFI = 0.913, GFI = 0.929, AGFI = 0.917, TLI = 0.902, RMSEA = 0.034, and RMR = 0.041, all meeting standard cut-off values. Although the Normed Fit Index (NFI = 0.842) falls below the typical 0.90 benchmark, this is considered acceptable in complex or exploratory models, as supported by Marsh et al. (2004), Kline (2023), and Schreiber et al. (2006), who stress evaluating model fit holistically. Overall, the model demonstrates an acceptable and reliable fit to the data.

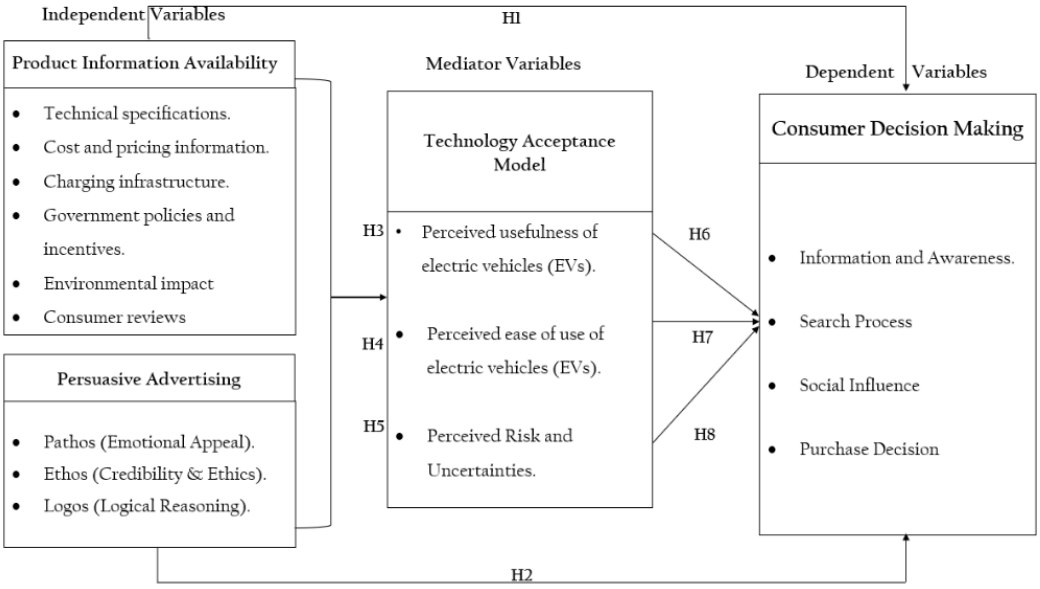

Figure 1: The Research Framework for Analyzing the Drivers of Green Product Adoption in Thailand

Notes: The research framework for analyzing the drivers of green product adoption in Thailand: A focus on EVs transportation (Varpio, 2018; Fauzan et al., 2019; Rogers et al., 2019; Romanova & Smirnova, 2019; Davis, 1989; Venkatesh & Davis, 2000; Kotler et al., 2010; Panwar et al., 2019; Mandys, 2021; Vrtana & Krizanova, 2023).

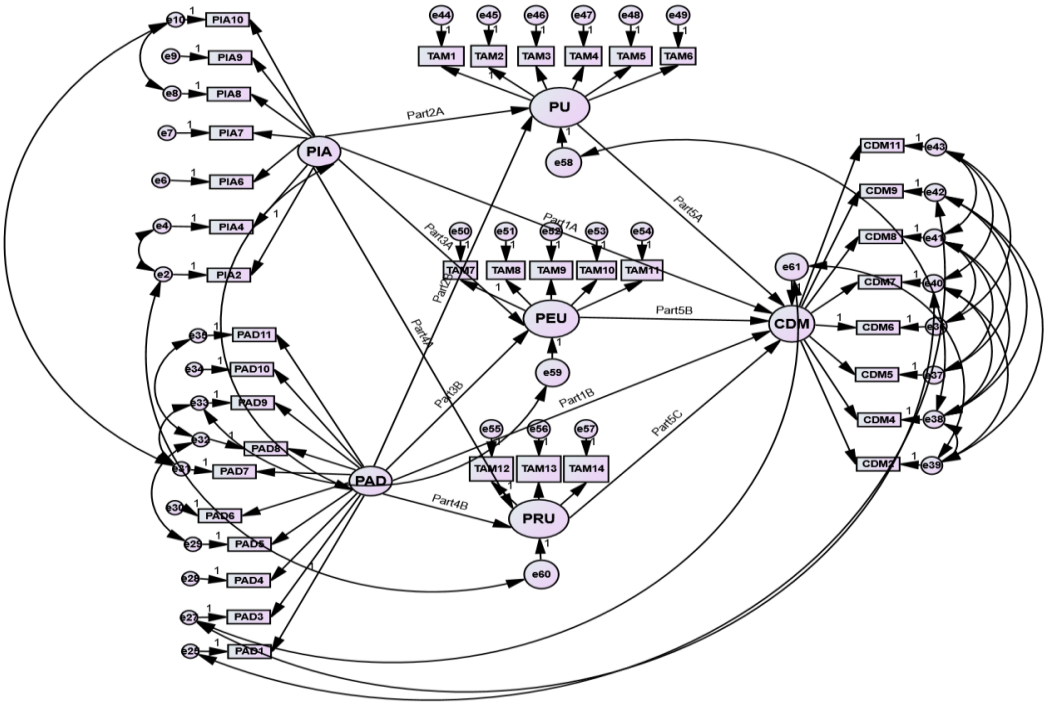

Figure 2: Hypothesis Model for Goodness-of-fit Testing

Notes: The model fit indices are as follows: Chi-square = 1355.230, df = 665, p = 0.000; RMSEA = 0.034 (< 0.05); RMR = 0.041 (< 0.05); GFI = 0.929 (> 0.90); AGFI = 0.917 (> 0.90); IFI = 0.913 (> 0.90); NFI = 0.842 (> 0.90); CFI = 0.912 (> 0.90); TLI = 0.902 (> 0.90); CMIN/DF = 2.038 (< 3).

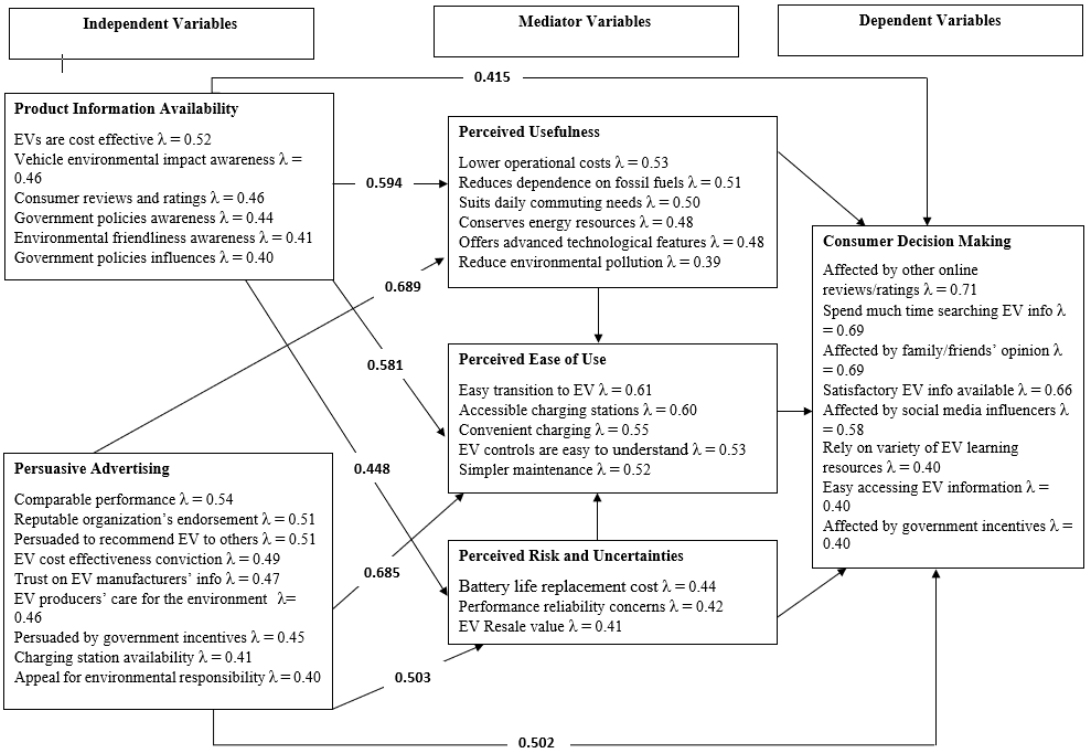

Figure 3: Hypothesis Results

Notes: $\chi 2$ (901) =1355.230, $p<0.05$, CFI=0.912, TLI=0.902, RMSEA=0.034, GFI=0.929