

The Influence of Price, Operating Cost, and Life Cycle Cost on Purchase Intention of Electric Vehicles Through Attitude as a Mediating Variable Among Prospective Consumers in Jabodetabek

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ABSTRACT

Background: The adoption of electric vehicles (EVs) is increasingly important as countries seek to reduce emissions from the transportation sector. However, EV adoption in Indonesia remains constrained by economic considerations, including high purchase prices and uncertainty regarding ownership costs. Understanding how consumers evaluate these economic factors is therefore important, particularly in the Jabodetabek region, where EV adoption has significant potential.

Purpose: This study aims to examine the influence of price, operating cost, and life cycle cost on consumers' purchase intention toward electric vehicles, with attitude serving as a mediating variable among prospective consumers in Jabodetabek.

Design/methodology/approach: This study employed a quantitative causal research design. Data were collected through a questionnaire from 240 prospective EV consumers in Jabodetabek selected through purposive sampling and analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS 4. The analysis included measurement model assessment, structural model assessment, direct and indirect effect testing, and predictive analysis using PLSpredict and importance–performance map analysis (IPMA).

Findings/Result: Price significantly affects both attitude and purchase intention, while life cycle cost also has significant effects on both variables. Operating cost significantly affects attitude but has no direct effect on purchase intention. Attitude significantly influences purchase intention and mediates the relationships between price, operating cost, and life cycle cost and purchase intention. PLSpredict indicates high predictive power, while IPMA identifies price as the priority area for improvement because it has high importance but the lowest performance.

Conclusion: Consumers' purchase intention toward electric vehicles is shaped by both economic and psychological evaluations. Price and life cycle cost have direct and indirect effects on purchase intention, whereas the influence of operating cost occurs indirectly through attitude. Positive consumer attitudes are therefore important in translating perceived economic benefits favorable price, lower operating cost, and lower life cycle cost into purchase intention.

Originality/value (State of the art): This study contributes to the EV adoption literature by examining price, operating cost, and life cycle cost simultaneously as economic determinants of purchase intention while positioning attitude as a mediating mechanism. The study provides empirical evidence from prospective EV consumers in Jabodetabek and highlights the importance of consumers' psychological evaluation in converting these economic evaluations into purchase intention.

ARTICLE INFO

Keywords:

electric vehicles, price, operating cost, life cycle cost, purchase intention

Article history:

Received:

10 September 2026

Revised:

29 September 2026

Accepted:

7 October 2026

How to Cite: Azizah, M. L., & Purwanto, E. (2026). The influence of price, operating cost, and life cycle cost on purchase intention of electric vehicles through attitude as a mediating variable among prospective consumers in Jabodetabek. *Business Review and Case Studies*, 7(2), 307. <https://doi.org/10.17358/brcs.7.2.307>

INTRODUCTION

Sustainability and climate change have increased the need for cleaner energy and more sustainable transportation systems. The transportation sector is one of the major contributors to greenhouse gas emissions, encouraging the transition from internal combustion engine vehicles to electric vehicles (EVs) as a cleaner transportation alternative (Khaleel et al., 2024). In Indonesia, EV adoption is growing, but internal combustion engine vehicles remain dominant. High initial purchase prices, ownership costs, and economic uncertainty remain important considerations for prospective consumers (Al Shurideh et

al., 2025; Tirtamidjaja et al., 2026). These considerations are particularly relevant in Jabodetabek, where vehicle ownership and daily mobility are relatively high (Puspita et al., 2024; Tama et al., 2023). Although EVs generally offer lower operating costs than conventional vehicles, their higher initial purchase prices may affect consumers' evaluations of their economic benefits (Arum et al., 2025). Therefore, evaluating EV affordability requires consideration not only of purchase price and operating costs but also of life cycle cost (LCC), which represents the total cost incurred throughout the vehicle's life cycle (Buberger et al., 2025).

Consumer decisions to purchase EVs involve an economic evaluation that extends beyond environmental awareness (Dutta & Hwang, 2021). Economic factors can influence purchase intention both directly and through consumers' attitudes toward EVs (Noor et al., 2025). Attitude also plays an important role in explaining consumers' intention to adopt EVs and may mediate the relationship between economic considerations and purchase intention (Qiu et al., 2025). This relationship is consistent with the Theory of Planned Behavior (TPB), which explains that behavioral intention is influenced by individual attitudes toward a behavior (Duong et al., 2026). Based on these considerations, this study examines the relationships among price, operating cost, LCC, attitude, and EV purchase intention. Previous studies have examined price and operating cost in relation to EV adoption; however, LCC has received comparatively less attention from a behavioral perspective. Existing LCC studies have primarily focused on economic evaluations and total cost of ownership rather than on how consumers perceive LCC in forming attitudes and purchase intentions (Buberger et al., 2025; Dutta & Hwang, 2021; Qiu et al., 2025). In addition, studies specifically examining these relationships among prospective EV consumers in Jabodetabek remain limited (Puspita et al., 2024; Tama et al., 2023).

Accordingly, this study proposes a research model in which price, operating cost, and LCC are examined as economic factors influencing attitude and purchase intention, while attitude is positioned as a mediating variable. The study aims to examine the effects of price, operating cost, and LCC on EV purchase intention through attitude among prospective consumers in Jabodetabek.

METHODS

This study employed a quantitative causal research design to examine the relationships among price, operating cost, life cycle cost, attitude, and electric vehicle (EV) purchase intention. The population comprised prospective EV consumers in Jabodetabek, with EVs marketed in Indonesia as the research object. Price, operating cost, and life cycle cost were independent variables, attitude was the mediating variable, and purchase intention was the dependent variable. The sample consisted of 240 respondents selected through purposive sampling, a non-probability technique in which respondents are chosen according to predetermined criteria. The sample size was determined based on the PLS-SEM

guideline of 5–10 times the number of indicators (Hair et al., 2021) for the 24 indicators in the initial instrument. Respondents were at least 26 years old, familiar with or interested in EVs, and intended to purchase an EV. Eligibility was verified through screening questions at the beginning of the questionnaire. Data were collected through a structured online questionnaire distributed via Google Forms. The measurement items used a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) (Bougie & Sekaran, 2019).

Data were analyzed using Partial Least Squares–Structural Equation Modeling (PLS-SEM) with SmartPLS 4. The analysis included measurement model assessment through validity and reliability testing, and structural model assessment using path coefficients, R^2 , and significance testing (Hair et al., 2021). Direct and indirect effects were examined to assess the relationships among the variables and the mediating role of attitude. Criteria included outer loadings ≥ 0.70 , AVE ≥ 0.50 , composite reliability ≥ 0.70 , HTMT < 0.90 , VIF < 3.3 , and bootstrapped significance ($t > 1.96$; $p < 0.05$). Predictive power was examined with PLSpredict by comparing PLS-SEM and linear model (LM) RMSE values (Shmueli et al., 2019), and IPMA identified high-importance, low-performance predictors as managerial priorities (Ringle & Sarstedt, 2016).

Drawing on the TPB (Ajzen, 1991), price, operating cost, and LCC are treated as economic beliefs, where higher scores denote more favorable perceptions (e.g., a price commensurate with value and lower expected costs). Price is the sacrifice consumers weigh against benefits (Nagle et al., 2023), operating cost reflects recurring energy and maintenance expenses (Liu et al., 2021), and LCC captures total ownership costs over the vehicle's life (Buberger et al., 2025); favorable perceptions of each are expected to improve attitudes and intentions (Al Shurideh et al., 2025; Noor et al., 2025). Hence, **H1/H2**: price positively affects attitude/purchase intention; **H3/H4**: operating cost positively affects attitude/purchase intention; and **H5/H6**: LCC positively affects attitude/purchase intention.

As attitude is the proximal determinant of intention and often transforms economic evaluations into psychological appraisals (Qiu et al., 2025; Shalender & Sharma, 2021), **H7**: attitude positively affects purchase intention; and **H8/H9/H10**: attitude mediates the effects of price/operating cost/LCC on purchase intention (Figure 1).

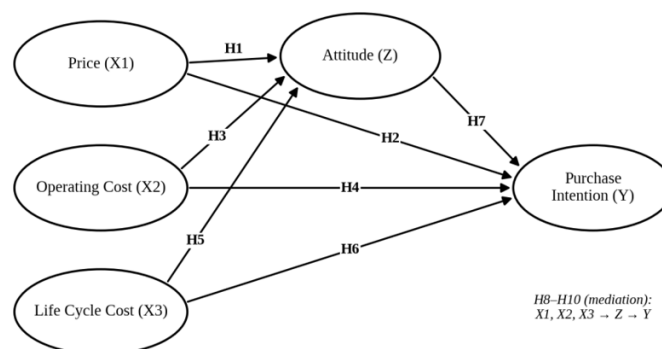


Figure 1. Research Model

Favorable economic perceptions are thus expected to strengthen purchase intention directly and through attitude, extending TPB-based EV models with LCC as a behavioral construct and informing EV pricing and cost-communication strategies.

RESULTS

Respondent Profile

The study involved 240 respondents who met the predetermined criteria and expressed an interest in purchasing electric vehicles (EVs). As shown in Table 1, the respondents were predominantly female (57.08%), aged 26–35 years (48.75%), private-sector employees (52.08%), and had monthly incomes of Rp15–20 million (37.92%). Most respondents resided in Tangerang (27.92%) or Jakarta (27.50%), and 95% owned a conventional car.

Measurement Model Assessment

The measurement model was assessed through convergent validity, discriminant validity, and construct reliability.

Convergent Validity

Of the 24 initial indicators, nine were removed during model refinement because their outer loadings did not meet the recommended criteria, leaving 15 indicators (three per construct). As shown in Table 2, all constructs achieved AVE values above the 0.50 threshold, ranging from 0.503 to 0.665. Most outer loading values exceeded 0.70, while LCC3 (0.615) and P3 (0.668) were retained because their respective constructs achieved acceptable AVE values. Overall, all constructs met the criteria for convergent validity and were considered suitable for further structural model analysis.

Discriminant Validity

Discriminant validity was assessed using cross loadings, the Fornell–Larcker criterion, and the Heterotrait–Monotrait Ratio (HTMT). As shown in Table 3, all indicators loaded more strongly on their respective constructs than on other constructs, indicating adequate discriminant validity based on cross loadings.

The Fornell–Larcker criterion was also satisfied, as the square root of AVE for each construct exceeded its correlations with other constructs (Table 4).

However, the HTMT results (Table 5) identified one value above the recommended threshold of 0.90, namely between Life Cycle Cost and Price (HTMT = 0.973), while all other HTMT values were below 0.90. This indicates a potential discriminant validity concern between these two constructs, suggesting that respondents may have perceived Life Cycle Cost and Price as relatively similar. Thus, although the cross-loading and Fornell–Larcker criteria were met, the HTMT result warrants particular attention regarding the distinction between Price and Life Cycle Cost.

Construct Reliability

The reliability assessment used Cronbach's Alpha and Composite Reliability. As shown in Table 6, all constructs achieved Composite Reliability values above 0.70, ranging from 0.750 to 0.856, indicating adequate internal consistency. Although several Cronbach's Alpha values were below 0.70, the Composite Reliability results support the reliability of all constructs for further structural analysis.

Collinearity Assessment

Collinearity was assessed using the Variance Inflation Factor (VIF). As shown in Table 7, all VIF values were below 3.3, ranging from 1.391 to 1.657. These results indicate that the predictor constructs do not exhibit problematic multicollinearity and that the structural model is free from significant collinearity concerns.

Structural Model Assessment

Coefficient of Determination

The coefficient of determination (R^2) (Table 8) indicates that Price, Operating Cost, and Life Cycle Cost explain 31.6% of the variance in Attitude ($R^2 = 0.316$). Meanwhile, Attitude, Price, Operating Cost, and Life Cycle Cost explain 43.2% of the variance in Purchase Intention ($R^2 = 0.432$). Thus, the model provides greater explanatory power for Purchase Intention, while the remaining variance is attributable to factors outside the model.

Table 1. Respondent Characteristics

Variable	Category	n	%
Gender	Male	103	42.92
	Female	137	57.08
Age	26–35 years	117	48.75
	36–45 years	69	28.75
	46–55 years	45	18.75
	>56 years	9	3.75
Occupation	Private-sector employee	125	52.08
	Entrepreneur	57	23.75
	Civil servant	58	24.17
Interest in EV	Yes	240	100
Income	Rp15–20 million	91	37.92
	Rp20–25 million	76	31.67
	Rp25–30 million	39	16.25
	>Rp30 million	34	14.17
Domicile	Jakarta	66	27.50
	Tangerang	67	27.92
	Bogor	37	15.42
	Depok	43	17.92
	Bekasi	27	11.25
Car ownership	Yes	228	95.00
	No	12	5.00

Table 2. Convergent Validity Results

Construct	Indicator	Outer Loading	AVE
Attitude	AT1	0.821	0.665
	AT2	0.811	
	AT3	0.815	
Life Cycle Cost	LCC1	0.710	0.503
	LCC2	0.792	
	LCC3	0.615	
Operating Cost	OC1	0.711	0.560
	OC2	0.764	
	OC3	0.768	
Price	P1	0.735	0.505
	P2	0.727	
	P3	0.668	
Purchase Intention	PI1	0.787	0.579
	PI2	0.705	
	PI3	0.788	

Table 3. Cross-Loading Results

Indicator	Attitude	Life Cycle Cost	Operating Cost	Price	Purchase Intention
AT1	0.821	0.329	0.349	0.421	0.460
AT2	0.811	0.429	0.305	0.382	0.442
AT3	0.815	0.405	0.340	0.370	0.499
LCC1	0.396	0.710	0.292	0.379	0.315
LCC2	0.360	0.792	0.413	0.476	0.474
LCC3	0.231	0.615	0.320	0.232	0.229
OC1	0.317	0.357	0.711	0.304	0.209
OC2	0.297	0.371	0.764	0.372	0.333
OC3	0.302	0.358	0.768	0.313	0.283
P1	0.388	0.469	0.355	0.735	0.359
P2	0.331	0.346	0.300	0.727	0.425
P3	0.297	0.315	0.284	0.668	0.307
PI1	0.502	0.439	0.272	0.366	0.787
PI2	0.417	0.334	0.353	0.338	0.705
PI3	0.383	0.364	0.230	0.475	0.788

Table 4. Fornell–Larcker Criterion

Construct	Attitude	Life Cycle Cost	Operating Cost	Price	Purchase Intention
Attitude	0.816	0.475	0.407	0.479	0.573
Life Cycle Cost	0.475	0.709	0.483	0.534	0.501
Operating Cost	0.407	0.483	0.748	0.442	0.371
Price	0.479	0.534	0.442	0.710	0.516
Purchase Intention	0.573	0.501	0.371	0.516	0.761

Table 5. HTMT Results

Construct	Attitude	Life Cycle Cost	Operating Cost	Price	Purchase Intention
Attitude	—	0.739	0.604	0.769	0.826
Life Cycle Cost	0.739	—	0.853	0.973	0.823
Operating Cost	0.604	0.853	—	0.785	0.595
Price	0.769	0.973	0.785	—	0.896
Purchase Intention	0.826	0.823	0.595	0.896	—

Table 6. Reliability Results

Construct	Cronbach's Alpha	Composite Reliability
Attitude	0.749	0.856
Life Cycle Cost	0.520	0.750
Operating Cost	0.608	0.792
Price	0.512	0.753
Purchase Intention	0.636	0.805

Table 7. Variance Inflation Factor (VIF) Results

Predictor	Attitude	Purchase Intention
Attitude	—	1.463
Life Cycle Cost	1.566	1.657
Operating Cost	1.391	1.431
Price	1.491	1.600

Table 8. Coefficient of Determination (R^2)

Endogenous Construct	R^2	Adjusted R^2
Attitude	0.316	0.308
Purchase Intention	0.432	0.422

Effect Size

The effect size (f^2) (Table 9) indicates that Attitude has a moderate effect on Purchase Intention ($f^2 = 0.156$). Price has small effects on Attitude ($f^2 = 0.073$) and Purchase Intention ($f^2 = 0.056$), while Life Cycle Cost has small effects on Attitude ($f^2 = 0.058$) and Purchase Intention ($f^2 = 0.040$). Operating Cost has a small effect on Attitude ($f^2 = 0.029$) but a negligible effect on Purchase Intention ($f^2 = 0.001$). Overall, Attitude provides the most substantial individual contribution to Purchase Intention.

Path Coefficients and Bootstrapping

The bootstrapping results (Table 10) show that six of the seven direct relationships are positive and significant. Attitude significantly affects Purchase Intention ($\beta = 0.360$, $t = 5.398$, $p < 0.001$). Life Cycle Cost significantly affects Attitude ($\beta = 0.250$, $t = 2.900$, $p = 0.004$) and Purchase Intention ($\beta = 0.194$, $t = 2.645$, $p = 0.008$), while Price significantly affects Attitude ($\beta = 0.272$, $t = 3.198$, $p = 0.001$) and Purchase Intention ($\beta = 0.226$, $t = 2.634$, $p = 0.009$). Operating Cost significantly affects Attitude ($\beta = 0.165$, $t = 2.804$, $p = 0.005$), but its direct effect on Purchase Intention is not significant ($\beta = 0.031$, $t = 0.362$, $p = 0.718$). These results confirm the important role of Attitude in explaining Purchase Intention and suggest that the influence of Operating Cost may primarily operate through Attitude.

Mediation Analysis

The mediation analysis based on bootstrapping shows that all three indirect effects through Attitude are positive and significant (Table 11). Life Cycle Cost significantly affects Purchase Intention through Attitude ($\beta = 0.090$, $t = 2.430$, $p = 0.015$), as do Operating Cost ($\beta = 0.059$, $t = 2.500$, $p =$

0.013) and Price ($\beta = 0.098$, $t = 2.839$, $p = 0.005$). These results confirm that Attitude mediates the effects of all three economic factors on Purchase Intention. Operating Cost shows an indirect effect despite its insignificant direct effect, indicating mediation through Attitude, while Price and Life Cycle Cost show significant direct and indirect effects, indicating complementary partial mediation.

Predictive Assessment

PLSpredict was used to assess the model's out-of-sample predictive performance by comparing PLS-SEM and linear model (LM) RMSE values. As shown in Table 12, all six indicators (AT1–AT3 and PI1–PI3) had lower RMSE values under PLS-SEM than the LM benchmark. Following Shmueli et al. (2019), because all indicators yielded lower prediction errors under PLS-SEM than under the LM benchmark, the model demonstrates high predictive power, although the difference for PI3 is marginal (-0.001).

Importance-Performance Map Analysis (IPMA)

IPMA was conducted using Attitude and Purchase Intention as target constructs to compare the importance (total effects) and performance (rescaled latent variable scores, 0–100) of their predictors (Ringle & Sarstedt, 2016). The results are summarized in Table 13 and Figure 2.

Price has high importance for Attitude (0.272) and Purchase Intention (0.324) but the lowest performance (69.751); as shown in Figure 2, it lies in the high-importance, low-performance quadrant for both targets and is the main priority for improvement. Attitude and Life Cycle Cost lie in the high-importance, high-performance quadrant and should be maintained, whereas Operating Cost, with the lowest importance, is a lower priority.

Table 9. Effect Size (f^2) Results

Relationship	f^2	Effect Size
Attitude → Purchase Intention	0.156	Medium
Life Cycle Cost → Attitude	0.058	Small
Life Cycle Cost → Purchase Intention	0.040	Small
Operating Cost → Attitude	0.029	Small
Operating Cost → Purchase Intention	0.001	Negligible
Price → Attitude	0.073	Small
Price → Purchase Intention	0.056	Small

Table 10. Path Coefficients and Bootstrapping Results

Structural Path	Path Coefficient (β)	T-Statistics	P-Values	Decision
H7: Attitude → Purchase Intention	0.360	5.398	<0.001	Supported
H5: Life Cycle Cost → Attitude	0.250	2.900	0.004	Supported
H6: Life Cycle Cost → Purchase Intention	0.194	2.645	0.008	Supported
H3: Operating Cost → Attitude	0.165	2.804	0.005	Supported
H4: Operating Cost → Purchase Intention	0.031	0.362	0.718	Not supported
H1: Price → Attitude	0.272	3.198	0.001	Supported
H2: Price → Purchase Intention	0.226	2.634	0.009	Supported

Table 11. Specific Indirect Effects

Indirect Effect	Path Coefficient (β)	T-Statistics	P-Values	Decision
H10: Life Cycle Cost → Attitude → Purchase Intention	0.090	2.430	0.015	Supported
H9: Operating Cost → Attitude → Purchase Intention	0.059	2.500	0.013	Supported
H8: Price → Attitude → Purchase Intention	0.098	2.839	0.005	Supported

Table 12. PLSpredict Results

Indicator	PLS-SEM RMSE	LM RMSE	Difference (PLS-SEM – LM)
AT1	0.647	0.650	-0.003
AT2	0.690	0.702	-0.012
AT3	0.682	0.704	-0.022
PI1	0.716	0.733	-0.017
PI2	0.751	0.768	-0.017
PI3	0.755	0.756	-0.001

Table 13. Importance-Performance Map Analysis Results

Construct	Importance for Attitude	Importance for Purchase Intention	Performance
Attitude	—	0.360	77.493
Price	0.272	0.324	69.751
Life Cycle Cost	0.250	0.284	76.106
Operating Cost	0.165	0.091	73.122

Economic considerations significantly shape prospective consumers' attitudes and purchase intentions toward electric vehicles (EVs) in Jabodetabek. Price positively affects Attitude ($\beta = 0.272$, $t = 3.198$, $p = 0.001$) and Purchase Intention ($\beta = 0.226$, $t = 2.634$, $p = 0.009$); thus, H1 and H2 are supported. This supports Nagle et al. (2023), who state price is a reference for comparing sacrifices with benefits. Additionally, Levriani & Dos Santos (2021) note that price perception shapes early preferences, and Al Shurideh et

al. (2025) highlight initial price as a critical adoption factor. Similarly, Life Cycle Cost positively influences Attitude ($\beta = 0.250$, $t = 2.900$, $p = 0.004$) and Purchase Intention ($\beta = 0.194$, $t = 2.645$, $p = 0.008$), supporting H5 and H6. Ma et al. (2025) emphasize the importance of comparing initial spending with long-term savings. Buberger et al. (2025) add that total ownership costs build positive attitudes, while Romeral & Zancul (2025) confirm these life-cycle differences directly influence EV competitiveness.

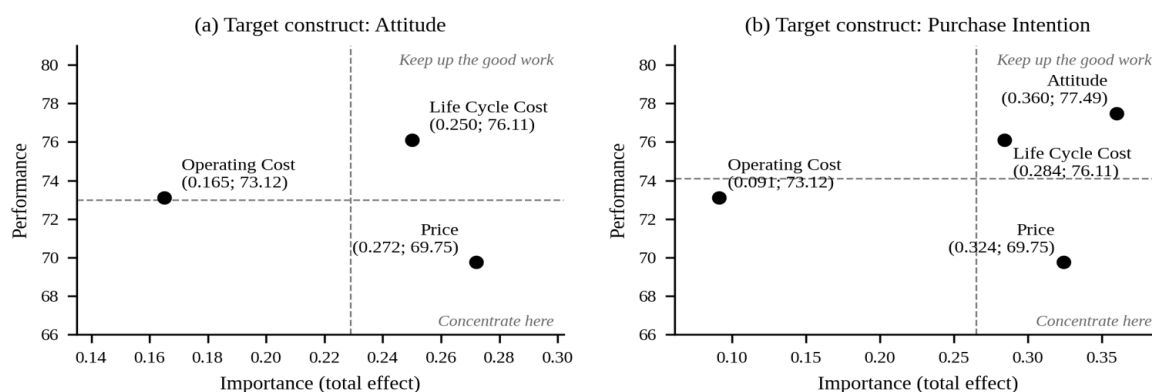


Figure 2. Importance-Performance Maps for (a) Attitude and (b) Purchase Intention (dashed lines: mean values)

Conversely, Operating Cost improves Attitude ($\beta = 0.165$, $t = 2.804$, $p = 0.005$) but has an insignificant direct effect on Purchase Intention ($\beta = 0.031$, $t = 0.362$, $p = 0.718$); therefore, H3 is supported, whereas H4 is rejected. High initial prices often limit the direct impact of operating savings, as observed by Al Shurideh et al. (2025). Instead, Ouyang et al. (2021) argue that operating costs are evaluated during attitude formation. Liu et al. (2021) further note that such savings must first become positive beliefs to drive adoption. Consequently, Attitude has a strong direct effect on Purchase Intention ($\beta = 0.360$, $t = 5.398$, $p < 0.001$), supporting H7. This reflects the Theory of Planned Behavior, where attitude determines behavioral intent (Al-Mamary & Alraja, 2022). Favorable evaluations strengthen this intention (Bae & Chang, 2021), particularly concerning new automotive technologies (Shalender & Sharma, 2021).

Attitude significantly mediates the relationships between Purchase Intention and Price ($\beta = 0.098$, $t = 2.839$, $p = 0.005$), Life Cycle Cost ($\beta = 0.090$, $t = 2.430$, $p = 0.015$), and Operating Cost ($\beta = 0.059$, $t = 2.500$, $p = 0.013$), supporting H8, H10, and H9, respectively. This mediation is crucial for Operating Cost given its lack of direct significance. Ultimately, economic evaluations do not always translate directly into purchases but are first transformed into psychological appraisals (Farajnezhad et al., 2024). Gupta et al. (2024) view attitude as a crucial bridge for these economic factors. Furthermore, Qiu et al. (2025) reiterate that attitude successfully mediates the effects of external factors like price and ownership costs on vehicle adoption intentions.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The findings indicate that EV purchase intention among prospective consumers in Jabodetabek is shaped by both economic and psychological evaluations. Price and Life Cycle Cost have significant positive effects on Attitude and Purchase Intention, while Operating Cost significantly affects Attitude but not Purchase Intention directly. However, Operating Cost has a significant indirect effect through Attitude, confirming that favorable perceptions of EV value and benefits are important in translating economic considerations

into purchase intention. Attitude also has a significant positive effect on Purchase Intention and mediates the relationships between Price, Operating Cost, and Life Cycle Cost and Purchase Intention.

Recommendations

Theoretically, this study extends TPB-based EV research by showing that economic beliefs, including the rarely examined LCC, shape intention largely through attitude, and that operating cost affects intention only after being translated into favorable evaluations. From a managerial perspective, EV manufacturers and marketers should communicate both the initial price and the long-term economic benefits of EV ownership. Marketing strategies should emphasize perceived price value as well as potential savings from operating and life cycle costs to strengthen consumers' favorable attitudes toward EVs. By integrating economic information with communication of the overall benefits and value of EV ownership, businesses can better support consumers' decision-making and encourage EV purchase intention. Consistent with the IPMA, price-related strategies such as financing schemes and incentives should be prioritized.

This study has limitations. The high HTMT between Price and Life Cycle Cost (0.973) and low Cronbach's alpha values suggest refining these measures with more distinct items, while the cross-sectional, purposive Jabodetabek sample limits generalizability. Future research could use probability or multi-regional samples and add subjective norms, perceived behavioral control, charging infrastructure, and incentives to the model.

CONFLICT OF INTEREST: The author declares no conflict of interest.

FUNDING STATEMENT: This research did not receive any specific grant from funding agencies in the public, commercial, or not - for - profit sectors.

DECLARATION OF GENERATIVE AI STATEMENT: During the preparation of this work, the authors used ChatGPT to check grammar and polish text. After using this tool/service, the authors reviewed and edited the content as needed and take full responsibility for the content of the publication.

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