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An Integrated Policy-Behavioral Model for Enhancing EV Adoption Intention: The Roles of Infrastructure Readiness, Government Promotion, and Occupational Heterogeneity

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Abstract: This study formulates and tests a policy-behavioral framework to elucidate the intention to adopt electric vehicles (EVs) by incorporating charging infrastructure, governmental promotional efforts, innovativeness, and perceived behavioral control. It also investigates if these correlations vary among occupational groupings. A quantitative explanatory methodology was utilized, employing secondary survey data from 169 prospective electric vehicle customers in Greater Jakarta, Indonesia. The proposed model was examined utilising Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS 4, encompassing measurement and structural model assessment, mediation analysis, measurement invariance testing (MICOM), and permutation-based multi-group analysis (MGA). The findings indicate that charging infrastructure substantially enhances perceived behavioral control, which completely mediates its influence on the propensity to acquire electric vehicles. Government promotional effort and innovation significantly enhance adoption intention. Furthermore, disparities in occupational responses were observed, with entrepreneurs and employees responding differently to perceived behavioral control and government promotional effort. These findings enhance research on electric vehicle adoption by identifying charging infrastructure as an indirect catalyst for adoption via perceived behavioral control, broadening the notion of government promotional effort beyond mere financial incentives, and emphasising occupational diversity in behavioral responses. The research provides actionable information for formulating more focused electric vehicle regulations in developing economies.

Keywords: Electric Vehicle Adoption, Charging Infrastructure, Perceived Behavioral Control, Government Promotional Effort, Occupational Differences

INTRODUCTION

The shift to electric vehicles (EVs) has emerged as a fundamental component of global initiatives to reduce greenhouse gas emissions and achieve sustainable mobility, as EVs markedly decrease tailpipe emissions and local air pollutants compared to internal combustion engine vehicles (Bryła et al., 2023). Governments increasingly view electric vehicle adoption as an essential strategy for decarbonising the transportation sector, enhancing urban air quality, and diminishing reliance on fossil fuels. Nonetheless, the adoption of electric vehicles is markedly inconsistent across nations, especially in emerging economies, where infrastructure deficiencies and legislative ambiguities hinder widespread adoption (Durmus Senyapar et al., 2023).

Current studies on electric vehicle adoption have predominantly concentrated on economic and technological factors, such as acquisition cost, driving range, battery efficiency, financial incentives, and charging infrastructure (Bryła et al., 2023; Salari, 2022). While these factors are significant, recent systematic reviews demonstrate that they account for only a portion of the variability in electric vehicle adoption intentions and behaviours, underscoring the necessity to integrate behavioral and institutional mechanisms into current adoption models (Dutta & Hwang, 2021; Hwang, 2025).

Recent data indicate that the adoption of electric vehicles should be regarded not merely as a technological or economic choice but as a policy-behavioral phenomenon. The proliferation of electric vehicles (EVs) depends on the interplay among institutional support, infrastructure preparedness, and individual behavioral responses, suggesting that effective transitions to sustainable mobility require aligning public policy with consumer choices (Bryła et al., 2023; Dutta & Hwang, 2021; Fu, 2024). This viewpoint is especially pertinent in developing economies, where infrastructure limitations and regulatory ambiguity render government commitment and perceived feasibility more significant than mere economic factors (Prakhar et al., 2025; Zheng et al., 2024).

From a behavioral standpoint, electric vehicle adoption is a multifaceted decision characterised by uncertainty, perceived risk, and dependence on external infrastructure and regulatory assistance (Yeğin & Ikram, 2022). The Theory of Planned Behaviour (TPB) provides a useful theoretical framework for elucidating such decisions by positing that behavioral intention is shaped by individuals' perceived capacity to perform behaviour under prevailing circumstances (Ajzen, 1991, 2020). In the Theory of Planned Behaviour (TPB), perceived behavioral control is significant as it indicates how external facilitating conditions, such as charging infrastructure and regulatory ease, bolster individuals' confidence in adopting electric vehicles (EVs) rather than directly influencing adoption decisions (Ajzen, 2020; Jusuf & Sunitiyoso, 2025). Consequently, individuals who recognise enhanced behavioral control are more inclined to form robust intentions to adopt electric vehicles despite technological ambiguity (Yeğin & Ikram, 2022).

In addition to behavioral control, both institutional and individual factors have surfaced as significant predictors of electric vehicle adoption. Government involvement has broadened from direct purchase subsidies to encompass regulatory facilitation, investment in charging infrastructure, informational campaigns, and non-financial incentives such as preferential access, parking advantages, and exemptions from road tolls (Bryła et al., 2023; Cerruti et al., 2024). These promotional initiatives not only reduce economic barriers but also serve as institutional indicators that bolster policy credibility, enhance legitimacy, and mitigate uncertainty about long-term electric vehicle adoption, especially in developing economies (Durmus Senyapar et al., 2023; Joshi et al., 2022; Sabata et al., 2023).

At the individual level, innovativeness has garnered increasing attention as a significant predictor of electric vehicle adoption. Individuals exhibiting greater innovativeness are typically more inclined to embrace emerging technologies and perceive lower risks associated with innovation. Prior research on the technology readiness of electric vehicle adoption indicates that innovativeness substantially affects purchase intention (Salari, 2022; Xie et al., 2022). Recent evidence indicates that innovativeness independently influences the intention to adopt electric vehicles, even when accounting for infrastructure and policy factors, underscoring the significance of a personal orientation toward innovation in the adoption of sustainable technology (Durmus Senyapar et al., 2023).

Notwithstanding these advancements, three significant research gaps persist. Numerous empirical studies continue to model charging infrastructure as a direct predictor of electric vehicle adoption intention. In contrast, recent Theory of Planned Behavior-based studies indicate that external facilitating conditions often exert an indirect influence on behavioral intention via perceived behavioral control (Nareswari & Arini, 2025). Secondly, government involvement is often perceived solely through the lens of financial incentives, with insufficient attention to a broader conception of government promotional effort, including regulatory facilitation, symbolic commitment, and non-financial incentives (Cerruti et al., 2024; Sabata et al., 2023). Third, while heterogeneity in electric vehicle adoption has been analysed across demographic and socioeconomic factors, occupational heterogeneity, especially the distinctions between entrepreneurs and organizational employees, has been largely neglected despite its possible impact on mobility requirements, financial risk, and technology adoption behaviour (Bryła et al., 2023; Jia & Chen, 2022).

This study formulates a policy-behavioral framework to elucidate the intention to adopt electric vehicles, thereby addressing existing gaps. Utilising the Theory of Planned Behaviour, the proposed model identifies perceived behavioral control as a pivotal mediating factor by which charging infrastructure affects adoption intention, while framing government promotional effort and innovativeness as independent determinants of that intention. This study utilises Multi-Group Analysis (MGA) to examine behavioral heterogeneity by comparing entrepreneurs and employees from public and private organizations, acknowledging that occupational background may influence responses to infrastructural, policy, and individual factors (Haustein & Jensen, 2018; Jia & Chen, 2022).

The study utilises Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS 4 to assess the proposed associations, encompassing mediation analysis and permutation-based multi-group analysis (MGA). PLS-SEM is particularly suitable for estimating intricate behavioral models that encompass many latent components while simultaneously analysing structural differences across groups (Bryła et al., 2023; Nareswari & Arini, 2025).

This research enhances the literature on electric vehicle adoption in four distinct ways. Initially, it elucidates the indirect role of charging infrastructure by showing its impact on adoption intention through perceived behavioral control. Secondly, it expands the understanding of governmental engagement beyond monetary incentives by incorporating government promotional effort as a holistic policy framework. Third, it affirms innovativeness as a distinct behavioral driver of electric vehicle adoption intention. Ultimately, by integrating occupationally based MGA, the study uncovers structural heterogeneity in the mechanisms of EV adoption among entrepreneurs and organizational employees, thus offering deeper theoretical insights and more precise policy implications for advancing EV adoption in emerging economies.

Unlike previous TPB-based studies that primarily examined infrastructure and government incentives as direct predictors of EV adoption, this study proposes a policy-behavioral framework that reconceptualizes charging infrastructure as an indirect enabler through perceived behavioral control, broadens government promotion beyond financial incentives to include institutional signaling and regulatory facilitation, and incorporates occupational heterogeneity as a boundary condition. Consequently, this study contributes not merely by extending the Theory of Planned Behavior but by integrating policy, behavioral, and occupational perspectives into a unified framework for explaining EV adoption in emerging economies.

Based on the preceding theoretical arguments and identified research gaps, the following hypotheses are proposed:

1. H1: Charging infrastructure positively influences perceived behavioral control.
2. H2: Perceived behavioral control positively influences intention to adopt electric vehicles.

3. H3: Government promotional effort positively influences intention to adopt electric vehicles.
4. H4: Innovativeness positively influences intention to adopt electric vehicles.
5. H5: Perceived behavioral control mediates the relationship between charging infrastructure and intention to adopt electric vehicles.
6. H6a: The effect of charging infrastructure on perceived behavioral control differs between entrepreneurs and public/private organization employees.
7. H6b: The effect of perceived behavioral control on intention to adopt electric vehicles differs between entrepreneurs and public/private organization employees.
8. H6c: The effect of government promotional effort on intention to adopt electric vehicles differs between entrepreneurs and public/private organization employees.
9. H6d: The effect of innovativeness on intention to adopt electric vehicles differs between entrepreneurs and public/private organization employees.
10. H6e: The indirect effect of charging infrastructure on intention to adopt electric vehicles through perceived behavioral control differs between entrepreneurs and public/private organization employees.

METHOD

Research Design and Data Source

This study utilized a quantitative, explanatory research design to investigate the factors influencing the desire to adopt electric vehicles (EVs). The analysis utilized secondary data from a prior survey that included 169 prospective EV users in the Greater Jakarta area, also known as Jabodetabek, Indonesia (Wiejaya & Gularso, 2024). This study reexamines the dataset to pursue an alternative theoretical aim by constructing and validating a policy-behavioral framework that includes mediation analysis and occupation-based multi-group analysis, which were not explored in the original research. Thus, the current study constitutes a theory-driven reexamination rather than a mere replication of prior results. The dataset provides adequate statistical power to evaluate the proposed structural model and to perform multi-group comparisons.

Sample and Grouping

The sample included participants from various demographic and professional backgrounds. In the multi-group analysis (MGA), participants were categorised into two occupational groups: entrepreneurs (n = 72) and workers of public or private organizations (n = 86). An additional 11 student respondents were included to estimate the overall structural model. They were excluded from the occupational MGA as they did not fit into either designated comparison group. This occupational classification is conceptually pertinent as vocational background indicates variations in risk exposure, decision-making autonomy, financial stability, and receptivity to public policy initiatives, all of which may affect EV adoption behaviour. The sample size for each comparison group surpassed the minimum guidelines for Partial Least Squares Structural Equation Modeling (PLS-SEM) and permutation-based Multi-Group Analysis (MGA) (Hair et al., 2022).

Measurement

All constructs were assessed using previously validated multi-item questionnaires, with responses recorded on a five-point Likert scale from 1 (strongly disagree) to 5 (strongly agree). The charging infrastructure was implemented utilising three metrics that reflect respondents' perceptions of the availability of charging facilities. Perceived behavioral control was assessed through six factors that represent respondents' perceived competence and control regarding electric vehicle adoption. The government promotional effort was evaluated using three measures reflecting perceptions of governmental incentives and promotional support, while innovativeness was assessed using four indicators that reflect citizens' receptiveness to new technology. The intention to adopt electric vehicles was assessed using five factors that reflect respondents' willingness and plans to embrace EVs. To guarantee measurement consistency and comparability, all measurement items were derived from a previously published work utilising the same dataset (Wiejaya & Gularso, 2024). This method reduces measurement error and guarantees that any detected variations are due to structural relationships rather than inconsistencies in the operationalization of the constructs.

Data Analysis Technique

The data were examined via Partial Least Squares Structural Equation Modeling (PLS-SEM) through SmartPLS 4. PLS-SEM was chosen due to its appropriateness for predictive research, intricate behavioral models encompassing several latent dimensions, mediation analysis, and multi-group comparisons (Hair et al., 2022). The investigation employed a two-phase approach consisting of measurement model evaluation and structural model assessment. Bootstrapping was used to evaluate the relevance of both direct and indirect effects, including the mediating role of perceived behavioral control. Before conducting the multi-group analysis, measurement invariance across occupational groups was evaluated using the Measurement Invariance of Composite Models (MICOM) approach to ensure valid comparisons. Subsequently, a permutation-based MGA was conducted to assess whether structural linkages differed significantly between entrepreneurs and employees of public and private organizations.

RESULTS AND DISCUSSION

This study examined data from respondents with varied demographic characteristics, ensuring adequate diversity to evaluate the proposed structural model and conduct a multi-group analysis. The demographic profile encompasses gender, age category, educational attainment, profession, and electric vehicle (EV) adoption status. Respondents were categorised into two occupational groups: entrepreneurs and employees of public or private organizations, which then formed the foundation for the multi-group analysis (MGA). This classification is theoretically significant, as vocational background may influence individuals' risk tolerance, financial flexibility, and response to government initiatives concerning electric vehicle adoption.

Respondent Profile

Table 1. Respondent Demographic Profile

Demographic Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	89	52.7%
	Female	80	47.3%
Age	18-27 years	47	27.8%
	28–42 years	66	39.1%
	43–58 years	56	33.1%
Education	High school	33	19.5%
	Bachelor degree	109	64.5%
	Master/Doctoral degree	27	16.0%
Occupation	Entrepreneur	72	42.6%
	Public/Private employee	86	50.9%
	Student	11	6.5%
EV Status	Current user	18	10.7%
	Non-user (intention)	151	89.3%

Source: Authors' own calculations based on survey data.

Measurement Model Evaluation
Reliability and Convergent Validity

The measurement model was assessed by examining indicator loadings, internal consistency reliability, and convergent validity. As reported in Table 2, all indicator loadings exceeded the recommended threshold of 0.70, indicating satisfactory indicator reliability. Furthermore, Cronbach's alpha and composite reliability values for all constructs were above 0.70, confirming adequate internal consistency reliability. Convergent validity was established, as the average variance extracted (AVE) values for all constructs exceeded the minimum criterion of 0.50. These results indicate that the measurement items consistently and adequately capture their respective latent constructs. Although the Cronbach's alpha value for charging infrastructure (0.652) was slightly below the conventional threshold of 0.70, its composite reliability (0.808) and AVE (0.584) exceeded the recommended criteria, indicating acceptable internal consistency for PLS-SEM research (Hair et al., 2022).

Table 2. Indicator Loadings, Reliability, and Convergent Validity

Construct/item	Outer Loading	Cronbach's Alpha	CR	AVE
Charging Infrastructure		0.652	0.808	0.584
I prefer charging facility at my working place	0.730			
I prefer charging facility at home	0.751			
I prefer charging facility on highway	0.810			
Government Promotional Effort		0.893	0.933	0.824
Government incentives and road access policies increase my intention to buy an EV.	0.877			
I believe that government's incentive policy such as direct grants to consumers on buying EV increases my intention	0.907			
I believe that government's financial incentive policy of buying EV increases my intention	0.938			
Intention to Adopt		0.858	0.898	0.639
I am willing to adopt EV when adopting a vehicle in the future.	0.715			
I have the intention to drive an EV in the near future	0.818			
I am currently considering buying an electric vehicle	0.813			
I will recommend the use of the EV to other people	0.830			
I plan to adopt EV when adopting a vehicle in the future.	0.815			
Innovativeness		0.810	0.874	0.635
Other people come to me for advice on new technologies	0.825			
In general, I am among the first in my circle of friends to acquire new technology when it appears	0.858			
I can usually figure out new high-tech products and services without help from others	0.703			
I keep up with the latest technological developments in my areas of interest	0.794			
Perceived Behavioral Control		0.871	0.903	0.608
I can find where to buy EV when I decide to adopt it.	0.776			
The price of EV is important when I decide to adopt it.	0.832			
The repair and maintenance of the EV are important when I decide to adopt it.	0.750			
It will not take me too much time to figure out the technicalities of using an EV	0.738			
If I am willing, I have the confidence to drive an EV	0.813			
Whether or not to drive an EV is completely upto me	0.766			

Source: Authors' own calculations using SmartPLS 4.

Discriminant Validity

Discriminant validity was evaluated using the heterotrait–monotrait (HTMT) ratio of correlations. As shown in Table 3, all HTMT values were below the conservative threshold of 0.90, indicating that each construct is empirically distinct from the others. This finding confirms that charging infrastructure, perceived behavioral control, government promotional effort, innovativeness, and intention to adopt represent conceptually and empirically different constructs within the proposed model.

Table 3. Discriminant Validity

	Construct	CI	GPE	IA	INN	PBC
HTMT Criterion	CI					
	GPE	0.597				
	IA	0.609	0.705			
	INN	0.398	0.465	0.657		
	PBC	0.801	0.709	0.675	0.472	
Fornell-Larcker Criterion	CI	0.764				
	GPE	0.484	0.908			
	IA	0.482	0.635	0.799		
	INN	0.286	0.394	0.561	0.797	
	PBC	0.624	0.630	0.604	0.365	0.780

Source: Authors' own calculations using SmartPLS 4.

Structural Model Assessment

Collinearity and Explanatory Power

Prior to hypothesis testing, collinearity among predictor constructs was assessed using variance inflation factor (VIF). All VIF values ranged from 1.000 to 1.750, well below the recommended threshold of 3.0, indicating that multicollinearity was not a concern (Hair et al., 2022). The explanatory power of the structural model was evaluated using the coefficient of determination (R^2) and predictive relevance (Q^2). As presented in Table 4, the R^2 values indicate that the model explains 38.9% of the variance in perceived behavioral control and 56.2% of the variance in intention to adopt electric vehicles. Furthermore, positive Q^2 values (0.368 for perceived behavioral control and 0.511 for intention to adopt) confirm that the model possesses adequate predictive relevance. The effect size (f^2) assessment further indicates that charging infrastructure exerts a large effect on perceived behavioral control ($f^2 = 0.638$), whereas innovativeness demonstrates a medium effect on intention to adopt ($f^2 = 0.205$). Government promotional effort ($f^2 = 0.144$) and perceived behavioral control ($f^2 = 0.101$) exhibit small effects, suggesting that all predictors contribute meaningfully to the model's explanatory power.

Table 4. Structural Model Quality Assesment

Endogenous Construct	R^2	Adjusted R^2	Q^2	VIF Range
IA	0.562	0.554	0.511	1.000-1.000
PBC	0.389	0.386	0.368	1.216-1.750

Source: Authors' own calculations using SmartPLS 4.

Direct Effects Hypothesis Testing

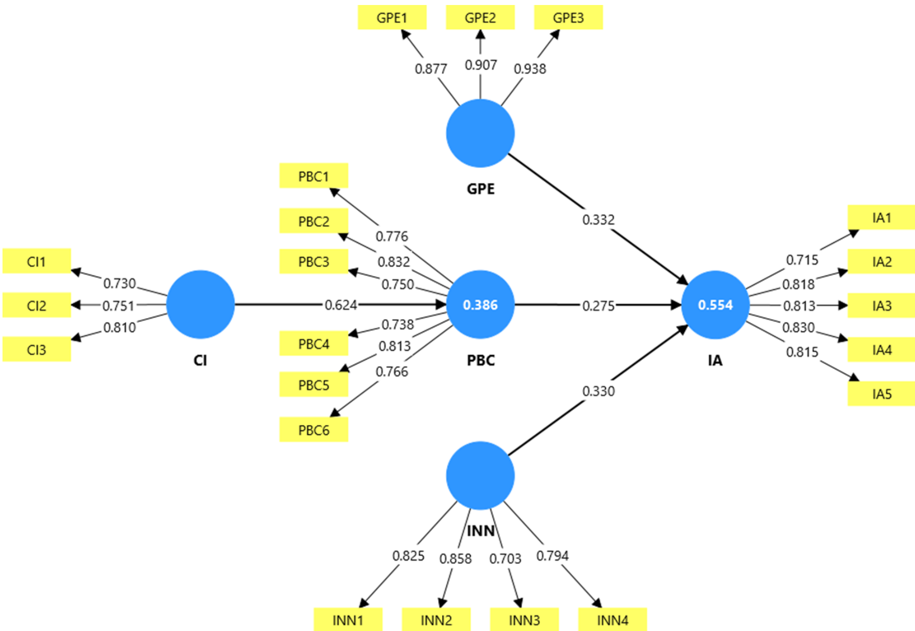
The direct effects were examined using the bootstrapping procedure with a large number of resamples. Table 5 summarizes the results of hypothesis testing for the main structural paths. The findings reveal that charging infrastructure has a significant positive effect on perceived behavioral control, supporting the notion that the availability and accessibility of charging facilities enhance individuals' perceived ability to use electric vehicles. Furthermore, perceived behavioral control was found to have a significant positive effect on intention to adopt EVs, highlighting its central role as a proximal determinant of adoption intention. In addition, government promotional effort and innovativeness were both found to exert significant positive effects on intention to adopt, underscoring the importance of policy support and individual innovation orientation in shaping EV adoption decisions.

Table 5. Structural Model Quality Assesment

Hypothesis	Structural Path	β	t-value	p-value	Decision
H1	CI → PBC	0.624	12.138	0.000	Supported
H2	PBC → IA	0.275	3.326	0.001	Supported
H3	GPE → IA	0.332	3.589	0.000	Supported
H4	INN → IA	0.330	5.050	0.000	Supported

Source: Authors' own calculations using SmartPLS 4.

To visually illustrate the estimated relationships, Figure 1 presents the structural model with standardized path coefficients and R^2 values for the endogenous constructs.



Source: Authors' own calculations using SmartPLS 4.

Figure 1. Structural model with standardized path coefficients

Mediation Analysis

The mediating role of perceived behavioral control in the relationship between charging infrastructure and intention to adopt was examined using the bootstrapping approach. As reported in Table 6, the indirect effect of charging infrastructure on intention to adopt through perceived behavioral control was statistically significant, with the confidence interval not including zero. This result confirms that perceived behavioral control acts as a significant mediating mechanism, indicating that charging infrastructure influences adoption intention primarily by enhancing individuals' perceived ability and control over EV usage.

Table 6. Mediation Effect of Perceived Behavioral Control

Hypothesis/ Mediation Path	Indirect Effect (β)	t-value	p-value	95% CI (LL–UL)	Mediation Type
H5 (CI → PBC → IA)	0.171	3.014	0.003	0.053-0.273	Full Mediation

Source: Authors' own calculations using SmartPLS 4.

Measurement Invariance Assessment

Before conducting the multi-group analysis, measurement invariance across occupational groups was assessed using the MICOM procedure. Table 7 presents the results of the measurement invariance assessment. The findings indicate that configural invariance was established for all constructs and that compositional invariance was supported, allowing meaningful comparisons of structural relationships between entrepreneurs and employees of public/private organizations. Establishing measurement invariance is a critical prerequisite for MGA, as it ensures that observed group differences are attributable to structural relationships rather than measurement artifacts.

Table 7. Measurement Invariance Assessment of Composite Models (MICOM) Based on Permutation Test

Construct	Configural Invariance	Compositional Invariance (Original Correlation)	5% Quantile	Permutation p-value	Partial Measurement Invariance	Mean Difference (p-value)
CI	Yes	0.999	0.952	0.914	Yes	0.612
GPE	Yes	0.998	0.997	0.105	Yes	0.639
IA	Yes	0.998	0.994	0.294	Yes	0.668
INN	Yes	0.995	0.978	0.507	Yes	0.578
PBC	Yes	0.996	0.994	0.151	Yes	0.781

Source: Authors' own calculations using SmartPLS 4.

Multi-Group Analysis by Occupation

A multi-group analysis was conducted to examine whether the structural relationships differ between entrepreneurs and public/private organization employees. The permutation test results are presented in Table 8. Overall, the findings indicate that occupational background explains significant heterogeneity in several structural relationships within the proposed model. Specifically, H6b, H6c, and H6e are supported, whereas H6a and H6d are not supported.

More specifically, no significant differences were found in the effect of charging infrastructure on perceived behavioral control (H6a) or in the effect of innovativeness on intention to adopt electric vehicles (H6d), indicating that these relationships remain relatively consistent across occupational groups. In contrast, significant differences were identified in the effects of perceived behavioral control on intention to adopt (H6b), of government promotional effort on intention to adopt (H6c), and of charging infrastructure on intention to adopt through perceived behavioral control (H6e). These findings suggest that entrepreneurs and public/private organization employees differ primarily in how behavioral control and government promotional effort influence EV adoption intention, rather than in how they perceive charging infrastructure or personal innovativeness. Overall, the results demonstrate that occupational heterogeneity is partial rather than universal, highlighting the importance of considering occupation-specific characteristics when designing EV promotion policies and implementation strategies.

Table 8. Multi-Group Analysis Results by Occupation

Hypothesis	Structural Path	β (Entrepreneur)	β (Public/Private Employees)	Path Difference	p-value	Result
H6a	CI → PBC	0.649	0.600	0.048	0.677	Not Supported
H6b	PBC → IA	0.462	0.029	0.433	0.010	Supported
H6c	GPE → IA	0.069	0.621	−0.553	0.002	Supported
H6d	INN → IA	0.432	0.237	0.195	0.139	Not Supported
H6e	CI → PBC → IA	0.300	0.017	0.283	0.014	Supported

Source: Authors' own calculations using SmartPLS 4.

Discussion

This study set out to examine the determinants of electric vehicle (EV) adoption intention by integrating charging infrastructure, government promotional effort, and innovativeness within a behavioral framework, while also accounting for occupational heterogeneity. The results provide several important insights that extend the existing literature on EV adoption, particularly in the context of emerging economies.

First, the findings confirm that charging infrastructure has a significant positive effect on perceived behavioral control, which, in turn, significantly influences the intention to adopt EVs. This result reinforces the central role of perceived behavioral control as proposed in the theory of planned behavior. Rather than directly shaping adoption intention, charging infrastructure appears to primarily serve as an enabling condition, enhancing individuals' perceptions of control and feasibility. This finding suggests that the presence of charging facilities reduces psychological barriers such as range anxiety and uncertainty regarding vehicle usability, thereby strengthening individuals' confidence in their ability to use EVs. In this sense, infrastructure development does not merely serve a technical function but also plays a critical psychological role in facilitating adoption behavior. This finding is consistent with recent international evidence reported by Fu (2024), Durmus Senyapar et al. (2023), and Zheng et al. (2024), which similarly found that charging infrastructure primarily influences adoption through improved perceptions of feasibility and reduced range anxiety rather than acting as a direct motivator of purchase intention. However, compared with studies conducted in more mature EV markets, the mediating role of perceived behavioral control appears particularly important in Indonesia, where infrastructure availability remains uneven.

Second, the significant mediating effect of perceived behavioral control highlights the importance of indirect mechanisms in explaining EV adoption. The mediation result indicates that charging infrastructure influences intention to adopt mainly through its impact on perceived behavioral control, rather than through a direct motivational pathway. This finding helps clarify inconsistencies in prior studies that reported mixed evidence regarding the direct effect of infrastructure availability on adoption intention. By explicitly modeling perceived behavioral control as a mediator, this study provides a more nuanced explanation of how infrastructural readiness translates into behavioral intention.

Third, the results demonstrate that government promotional effort has a direct and significant positive effect on the intention to adopt EVs. This finding underscores the importance of government involvement beyond financial subsidies alone. Government promotional effort, as conceptualized in this study, includes both financial and non-financial incentives as well as regulatory facilitation and symbolic support. The positive effect suggests that government actions serve as a signal of legitimacy and long-term commitment to EV development, thereby reducing perceived risk and uncertainty among potential adopters. In emerging market contexts, where institutional trust and policy continuity are often key concerns, such government signals may play a particularly important role in shaping adoption intentions. Similar evidence has been reported in studies from Turkey (Durmus Senyapar et al., 2023), India (Joshi et al., 2022), and European countries (Bryła et al., 2023), suggesting that government support consistently strengthens EV adoption intentions. However, this study extends previous findings by conceptualizing government promotional effort as a broader institutional mechanism encompassing regulatory facilitation and symbolic commitment rather than merely financial subsidies.

Fourth, innovativeness had a significant positive effect on the intention to adopt EVs, supporting the view that individual-level innovation orientation remains a critical driver of the adoption of disruptive, relatively new technologies. By isolating innovativeness as a standalone construct rather than treating it as a single dimension within a broader technology-readiness framework, this study demonstrates that individuals who are more open to new ideas and technologies are more likely to express an intention to adopt EVs. This finding is also aligned with Salari (2022), Xie et al. (2022), and Fu (2024), who demonstrated that consumers with stronger innovation orientation are more willing to adopt emerging transportation technologies despite technological uncertainty.

Beyond the main effects, the multi-group analysis reveals meaningful differences between entrepreneurs and public/private organization employees. The results indicate that the strength of several structural relationships varies across occupational groups, suggesting that EV adoption mechanisms are not uniform across society. The MGA results indicate that perceived behavioral control has a substantially stronger influence among entrepreneurs than employees. This may reflect entrepreneurs' greater decision-making autonomy and stronger dependence on operational flexibility, making confidence in EV usability more influential in purchase decisions. Conversely, government promotional effort exerts a stronger effect among employees, who may place greater emphasis on institutional credibility, policy certainty, and financial incentives because of relatively fixed income structures and lower tolerance for investment risk. These findings suggest that occupational background shapes not only economic capacity but also the cognitive mechanisms underlying EV adoption decisions.

Taken together, these findings contribute to the EV adoption literature in several ways. First, they provide empirical support for a policy-oriented behavioral model that emphasizes the indirect role of infrastructure through perceived behavioral control. Second, they highlight the importance of distinguishing government promotional effort from narrow financial incentives, thereby offering a broader perspective on the role of public policy in shaping adoption intentions. Third, the results demonstrate that innovativeness remains a powerful individual-level driver even after accounting for policy and infrastructural factors. Finally, the identification of occupational differences through multi-group analysis adds nuance to existing models, suggesting that segmentation based on occupational characteristics may be critical for understanding and promoting EV adoption in practice.

Overall, the discussion underscores that EV adoption is shaped by the interplay of structural conditions, policy signals, and individual dispositions, and that these relationships may vary across population segments. This integrated perspective provides a more comprehensive understanding of EV adoption behavior and lays the groundwork for targeted theoretical and practical advancements in this domain.

CONCLUSION

This study developed and validated a policy–behavioral framework to explain electric vehicle (EV) adoption intention by integrating charging infrastructure, government promotional effort, innovativeness, and perceived behavioral control while examining occupational heterogeneity through multi-group analysis. Using Partial Least Squares Structural Equation Modeling (PLS-SEM), the findings demonstrate that charging infrastructure influences adoption intention indirectly through perceived behavioral control, confirming its role as a behavioral enabler rather than a direct determinant of adoption. Government promotional effort and innovativeness were also found to exert significant positive effects on EV adoption intention, highlighting the complementary roles of institutional support and individual innovation orientation in shaping behavioral intentions.

The multi-group analysis further revealed that the effects of perceived behavioral control and government promotional effort differ significantly between entrepreneurs and employees of public and private organizations. These findings indicate that EV adoption mechanisms are not homogeneous across occupational groups, suggesting that individual socioeconomic contexts should be considered when designing behavioral models and policy interventions.

Overall, this study advances the EV adoption literature by extending the Theory of Planned Behavior through the integration of policy-related and behavioral constructs, broadening the conceptualization of government promotional effort beyond financial incentives, and demonstrating the importance of occupational heterogeneity in explaining adoption intention. The findings also provide practical evidence that expanding charging infrastructure should be accompanied by policies that enhance users' perceived behavioral control and that promotional strategies should be tailored to different occupational segments.

By integrating behavioral mechanisms, institutional support, and occupational heterogeneity within a single framework, this study offers a more comprehensive perspective for understanding and promoting EV adoption in emerging economies.

Despite these contributions, several limitations should be acknowledged. This study focuses on a specific empirical context and employs a cross-sectional design, which limits the ability to capture changes in EV adoption behavior over time. In addition, the model examines intention to adopt rather than actual adoption behavior. Because the study relies on secondary cross-sectional survey data, causal relationships should be interpreted cautiously. Although PLS-SEM is suitable for examining theoretically specified relationships, the findings reflect statistical associations rather than definitive causal effects. Furthermore, the use of respondents from Greater Jakarta limits the generalizability of the findings to other regions or countries with different policy environments, charging infrastructure, and market maturity. Future longitudinal and cross-country studies are therefore needed to validate the robustness of the proposed framework. Future research could extend this framework by incorporating longitudinal designs, actual EV usage, additional moderating variables, and broader cross-country or sector-specific comparisons to enhance the generalizability of the findings.

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