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UNDERSTANDING THE FACTORS INFLUENCING THE INTEREST IN ADOPTING BATTERY ELECTRIC VEHICLES (BEV): A QUANTITATIVE INVESTIGATION

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Abstract

This research employs a quantitative design to investigate factors influencing Battery Electric Vehicle (BEV) adoption intentions among Indonesians, using the framework developed by Elena Higueras-Castillo et al. (2021). By utilizing IBM SPSS, the study examines psychological and social factors such as attitudes towards BEVs, subjective norms, perceived behavioral control, and intention to use BEVs. Multiple hypotheses are tested using multiple regression analysis. Survey responses from 145 participants are analyzed using descriptive statistics, correlation analysis, multiple regression, and factor analysis to identify patterns and relationships. The study ensures validity and reliability through pre-testing the questionnaire and adhering to ethical guidelines. Statistical analyses reveal that attitudes, subjective norms, and perceived behavioral control significantly influence residents' readiness to adopt BEVs. The findings fill a knowledge gap in BEV adoption dynamics within Indonesia, offering insights for policymakers, urban planners, and other stakeholders. Based on the results, recommendations are made for policy interventions, infrastructure investments, and public awareness campaigns to accelerate the transition towards electric mobility. These insights can be leveraged to effectively market BEVs to new potential consumers by highlighting the positive attitudes, social norms, and perceived control factors that drive adoption.

Keywords: Battery Electric Vehicles, Indonesia, Consumer Perception.

Introduction

This research investigates the factors influencing Battery Electric Vehicle (BEV) adoption in Indonesia, focusing on consumer attitudes, perceived behavioral control, and subjective norms. The study builds on previous research, such as that by the ASEAN Centre for Energy (2018) and Rapson et al. (2023), which highlight the economic and environmental benefits of BEVs. Despite these benefits, BEV adoption remains low in Indonesia, with only a small fraction of vehicles being electric, far below the government's 2030 targets. Key barriers include the high initial purchase price due to costly battery technology, economic instability affecting disposable income, and inadequate charging infrastructure leading to range anxiety (Wolfram et al., 2016; International Energy Agency, 2020; Li et al., 2017; Wang et al., 2019). Additionally, concerns about battery life, replacement costs, and the underdeveloped maintenance infrastructure further impede adoption (Jin et al., 2017; Nicholas et al., 2017). Although the government has implemented incentives, their impact may be limited due to insufficient public awareness and the need for more effective policies (Hao et al., 2020). Misconceptions about BEVs' performance and cultural preferences also play a role in deterring potential adopters (Rezvani et al., 2015; Sovacool et al., 2018).

Battery Electric Vehicles (BEVs) have a long history, peaking in 1912 before declining due to cheap oil and limited electricity. Interest revived in the late 20th century due to environmental concerns, with the Tesla Roadster in the early 2000s showcasing BEV potential with its 320-kilometer range on a single charge. Technological advancements, especially in lithium-ion batteries, have driven BEV progress.

In Indonesia, BEV adoption is influenced by environmental benefits and economic incentives. BEVs help reduce urban air pollution and combat climate change. Government measures like tax breaks and subsidies aim to make BEVs more affordable, acknowledging their lower maintenance and fuel costs. However, high initial costs and range anxiety, particularly in areas with limited charging infrastructure, pose challenges.

Government policies such as *Perpres Nomor 55 Tahun 2019* promote BEV adoption through infrastructure development and incentives. While urban areas have seen improvements, rural areas still face limitations. Research highlights the importance of environmental awareness, economic benefits, and technological advancements in influencing BEV adoption. Financial incentives and subsidies play a crucial role in fostering positive attitudes towards BEVs.

Despite the benefits, high initial costs remain a barrier, though subsidies can help. Indonesia's efforts through tax breaks and infrastructure development are ongoing, but challenges like range anxiety and rural charging access persist. Increasing BEV adoption requires addressing economic, environmental, and performance aspects, along with continuous infrastructure improvements and public education on BEV benefits.

The history of Battery Electric Vehicles (BEVs) reflects a journey from early innovations to modern advancements. BEVs, once prevalent before the rise of combustion engine cars, experienced a decline due to cheap oil and limited electricity access. Their resurgence in the late 1960s and early 1980s was driven by growing environmental concerns, marking the second generation of electric vehicles. The introduction of the Tesla Roadster in the early 2000s marked a significant advancement, being the first highway-legal electric vehicle with a range exceeding 320 kilometers and utilizing lithium-ion batteries (Cunningham et al., 2019). This innovation addressed market demands for fuel efficiency and longer ranges, a trend that continues with vehicles like the Polestar 3, which boasts a range of over 500 kilometers.

In Indonesia, the adoption of BEVs has been influenced by both environmental and economic factors. BEVs offer significant environmental benefits, including zero tailpipe emissions, which contribute to reducing urban air pollution and combating climate change (Yang et al., 2019). Economic incentives, such as tax breaks and subsidies, have been implemented to make BEVs more accessible, reflecting the understanding of their long-term cost benefits and superior driving performance (Hardman et al., 2016). Despite these advancements, challenges persist. The high initial cost of BEVs compared to traditional vehicles remains a significant barrier, compounded by range anxiety and insufficient charging infrastructure (Liu et al., 2021). Government initiatives, such as *Perpres Nomor 55 Tahun 2019*, have aimed to improve infrastructure and incentivize BEV adoption. While urban areas have seen progress, access to charging stations in rural regions remains limited (Candra, 2022).

Previous studies highlight several critical factors influencing BEV adoption. Environmental awareness, perceived economic benefits, and technological advancements are key drivers, supported by government policies and financial incentives (Higueras-Castillo et al., 2021; Liu et al., 2021). The superior acceleration and performance of EVs compared to internal combustion engines further contribute to their appeal (Hardman et

al., 2016). The environmental benefits, especially when EVs are charged with renewable energy, resonate with eco-conscious consumers (Wilken et al., 2020). However, the high initial cost remains a substantial obstacle, though financial incentives can mitigate this barrier (Rezvani et al., 2015). In the Indonesian context, efforts to promote BEVs through tax breaks and infrastructure development are ongoing, yet challenges like range anxiety and limited rural charging access continue to hinder widespread adoption (Candra, 2022). Overall, increasing BEV adoption requires a comprehensive approach addressing economic, environmental, and performance factors while improving infrastructure and public education on the benefits of electric vehicles.

Battery Electric Vehicles (BEVs) offer significant advantages, including lower maintenance costs, greater mileage efficiency, reduced operating expenses, and quieter operation, all contributing to their appeal over internal combustion engine (ICE) vehicles. They are also equipped with advanced safety features, making them a compelling alternative (Rezvani et al., 2015; Egbue & Long, 2012). However, range anxiety, concerns about the vehicle's ability to cover necessary distances before needing a recharge, significantly impacts consumer attitudes, creating a barrier to adoption (Barbarossa et al., 2015; Jansson et al., 2017). The availability and convenience of charging infrastructure play a critical role in reducing this anxiety, enhancing consumer confidence, and positively influencing social norms (Wang et al., 2018; Sovacool et al., 2018).

Low noise levels of BEVs also improve consumer sentiment by reducing urban noise pollution, making them more appealing in urban settings and enhancing perceived vehicle control and comfort (Jenn et al., 2018; Schuitema et al., 2013). Additionally, BEVs' superior acceleration capabilities provide a more enjoyable driving experience, broadening their appeal and encouraging social acceptance (Hardman et al., 2016; Carley et al., 2013). Lastly, perceptions of safety and reliability significantly influence consumer opinions and adoption likelihood, with strong beliefs in BEV reliability and safety boosting consumer confidence and shaping positive social norms (Egbue & Long, 2012; Peters et al., 2014). Emphasizing these attributes can significantly boost BEV adoption and support a favorable market environment for sustainable transportation.

The long-term cost benefits of Battery Electric Vehicles (BEVs) significantly impact consumer decisions. Despite high initial costs and expensive battery replacements, charging BEVs is cheaper than fueling internal combustion engine (ICE) vehicles, leading to substantial savings. BEVs are simple to drive and require minimal adjustment from traditional vehicles. Government policies, like Indonesia's *Perpres Nomor 55 Tahun 2019*, offer financial incentives such as tax breaks and subsidies to enhance affordability, while expanded charging infrastructure mitigates range and convenience concerns. These measures collectively lower financial barriers and improve infrastructure, encouraging BEV adoption (Rezvani et al., 2015; Hardman et al., 2016).

Research shows that BEV pricing significantly influences consumer attitudes, with high costs deterring potential buyers and negatively affecting perceptions. Social norms also play a role, as concerns about BEV affordability among peer groups can discourage adoption (Carley et al., 2013). Financial incentives and subsidies can enhance perceived control and positively influence consumer perceptions (Hardman et al., 2016). BEVs charged with renewable electricity are more environmentally friendly than ICE vehicles, which can attract environmentally conscious buyers (Wilken et al., 2020). Additionally, lower maintenance and operational costs, along with ease of use, further promote BEV adoption (Lebeau et al., 2013; Graham-Rowe, 2012).

Government incentives, such as tax credits and subsidies, significantly influence consumer attitudes and adoption intentions. These incentives reduce ownership costs, making BEVs more appealing and accessible (Liu et al., 2021). Infrastructure development, as promoted by *Perpres Nomor 55 Tahun 2019*, is crucial in shaping consumer attitudes by addressing range anxiety and ensuring charging station availability. A robust charging network boosts consumer confidence and facilitates BEV adoption (Yang et al., 2019; Liu et al., 2021). Overall, comprehensive strategies addressing financial, environmental, and infrastructure aspects are essential to increase BEV adoption rates.

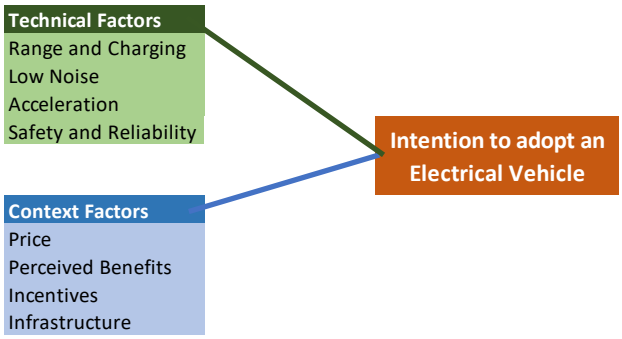

Figure 1. Electric Vehicle Adaptation

The research aims to examine how these factors, including high initial costs, economic stability, and charging infrastructure, affect BEV adoption in Indonesia. It will assess the impact of charging times, battery life concerns, and maintenance infrastructure on consumer attitudes. The study will also evaluate the effectiveness of current government policies and incentives, consumer awareness of BEV benefits, and cultural attitudes towards BEVs, alongside the influence of energy supply reliability and costs on adoption decisions. By addressing these issues, the research seeks to provide insights for targeted marketing strategies and policy improvements to increase BEV adoption.

Research Methods

This research utilizes a quantitative design as outlined by Mladenović et al. (2023) to explore the factors influencing Battery Electric Vehicle (BEV) adoption among residents of Indonesia. The study leverages IBM SPSS and Multiple Regression analysis to test a theoretical framework that incorporates psychological and social factors affecting BEV adoption, as conceptualized by Higueras-Castillo et al. (2021). Key constructs under investigation include attitudes toward BEVs, subjective norms, perceived behavioral control, and intention to use BEVs.

The sample is drawn from various demographic groups, including different age brackets, income levels, and metropolitan areas, using a stratified sampling approach to ensure comprehensive representation across socioeconomic and geographic segments. Participants are required to be at least 17 years old, possess a valid driver's license, and have a solid understanding of BEV technology. Data is gathered through an online questionnaire distributed to individuals familiar with or currently owning BEVs in major Indonesian cities, aiming to capture a broad range of perspectives on BEV adoption.

To ensure the validity and reliability of the research, the study includes pre-testing of the questionnaire to evaluate clarity and appropriateness, and statistical tests are employed to assess internal consistency and reliability. Ethical standards are strictly

followed, including obtaining informed consent from participants and ensuring confidentiality and anonymity of responses.

Data collection is conducted via a standardized online questionnaire, designed based on theoretical frameworks and current literature, ensuring validity and reliability in measurement. Questions assess various factors such as attitudes, subjective norms, and perceived behavioral control using a Likert scale ranging from strongly disagree to strongly agree. Primary data is obtained through electronic surveys, while secondary data is sourced from academic journals and certified websites. This methodology aims to provide a robust analysis of the factors influencing BEV adoption in Indonesia.

Research Model

The research model developed by Higueras-Castillo et al. (2021) explores eight independent variables influencing the intention to drive a Battery Electric Vehicle (BEV), focusing on aspects such as range and charging, low noise, acceleration, safety and reliability, price, perceived benefits, incentives, and infrastructure. The study aims to assess whether these factors impact Indonesian citizens' intentions to use BEVs for business purposes.

Research Hypotheses

The research hypotheses, grounded in the framework proposed by Elena Higueras-Castillo et al. (2021), explore the relationships between attitudes toward Battery Electric Vehicles (BEVs), subjective norms, perceived behavioral control, and the intention to use BEVs. Attitudes towards BEVs, influenced by perceived benefits such as environmental advantages and cost savings, significantly impact their adoption. Subjective norms, including social pressures from family and peers, also play a critical role. Perceived behavioral control, affected by factors like charging infrastructure and ease of use, further shapes adoption intentions. The hypotheses are as follows:

H1: Range and Charging positively influence BEV adoption intentions. The benefits of lower maintenance and recharging costs, as noted by Lebeau (2013), Rezvani et al. (2015), and Wang et al. (2018), enhance perceived behavioral control and adoption intentions.

H2: Low Noise positively affects BEV adoption. The quieter operation of BEVs compared to internal combustion engines can improve attitudes and increase adoption intentions, according to Goetchius (2011) and Hardman et al. (2016).

H3: Acceleration positively impacts BEV adoption. BEVs' ability to meet or exceed conventional vehicles' performance expectations, or to be adapted for urban settings, boosts positive attitudes and adoption intentions, as highlighted by Li (2019), Hardman et al. (2016), and Carley et al. (2013).

H4: Safety and Reliability positively influence adoption intentions. BEVs' safety features and battery reliability, which prevent immediate combustion in accidents, improve perceived control and attitudes, as discussed by Gandoman (2019), Rezvani et al. (2015), and Jenn et al. (2018).

H5: Price negatively affects adoption intentions. The high initial cost and potential battery replacement expenses can deter adoption, affecting perceived behavioral control negatively, as per Lebeau (2013), Rezvani et al. (2015), and Egbue and Long (2012).

H6: Perceived Benefits positively influence adoption intentions. The lower long-term costs of BEVs and their ease of use enhance positive attitudes and behavioral control, as supported by Graham-Rowe (2012) and Schuitema et al. (2013).

H7: Incentives positively impact BEV adoption. Financial benefits and lower taxes, as outlined in Perpres Nomor 55 Tahun 2019, reduce financial barriers and enhance adoption intentions, in line with Jenn et al. (2018), Rezvani et al. (2015), and Wang et al. (2018).

H8: Infrastructure negatively affects adoption intentions. Despite proactive measures under Perpres Nomor 55 Tahun 2019, existing infrastructure issues may still limit adoption intentions, according to Wang et al. (2018), Jenn et al. (2018), and Yang et al. (2019).

Questionnaire Design

The research employs a structured questionnaire to gather data on BEV adoption, divided into four sections. The Introduction section outlines the study's purpose and instructions. The Screening Questions ensure participants meet criteria such as residing in Indonesia and having relevant driving experience. The Main Questions consist of 32 items based on Higueras-Castillo et al. (2021), assessing variables like Range and Charging, Acceleration, Low Noise, Safety and Reliability, Perceived Benefits, Price, Incentives, Infrastructure, and Intention to Adopt BEVs, with responses rated on a five-point Likert scale. The Respondents' Profile section collects demographic information to aid in data analysis.

Quantitative data analysis techniques are used to explore residents' attitudes and intentions toward BEV adoption. Descriptive statistics provide an overview of the sample, correlation analysis examines variable relationships, and multiple regression analysis assesses predictive power while adjusting for demographic factors. Factor analysis reveals the underlying motivations for BEV adoption. The study's reliability and validity are ensured through measures to minimize measurement, sampling, and response biases.

The research targets potential Battery Electric Vehicle (BEV) adopters in Indonesia, focusing on adults who are knowledgeable about and may consider purchasing BEVs. The sample size is set at 100 respondents, considered adequate for exploratory and pilot studies according to Malhotra et al. (2020). This sample size aligns with recommendations for initial research aimed at identifying trends and generating preliminary insights rather than providing broadly generalized results. Although a larger sample could enhance reliability, the study's findings will offer valuable foundational data and support future, more detailed research on BEV adoption in Indonesia.

Data Analysis

The data analysis for this research involves several quantitative techniques to explore attitudes and intentions toward Battery Electric Vehicle (BEV) adoption. Descriptive statistics summarize sample characteristics and provide insights into residents' attitudes and intentions regarding BEVs. Correlation analysis examines relationships between variables such as attitudes, subjective norms, perceived behavioral control, and BEV adoption intentions (Zhang et al., 2021). Multiple regression analysis models the impact of significant variables on BEV adoption intentions, adjusting for demographic and confounding factors, following Castillo's methodology. Factor analysis identifies patterns in motivations related to environmental concerns, economic considerations, technological factors, and social influences.

To ensure reliability and validity, the research employs Cronbach's alpha for internal consistency, with a value of 0.60 or above considered acceptable. Validity is assessed through factor analysis and expert evaluations for content and construct validity.

Confirmatory factor analysis (CFA) validates the alignment of survey items with theoretical constructs, including infrastructure, safety and reliability, and perceived benefits. Descriptive statistics provide an overview of the data's central tendencies and variability, while assumption testing for multiple regression analysis checks for linearity, homoscedasticity, normality, and multicollinearity. Hypotheses testing uses multiple regression to evaluate the significance of relationships between variables, guiding data-driven recommendations and insights into BEV adoption behavior.

Results and Discussion

The data for this research were collected through a stratified sampling method from major cities in Indonesia, targeting individuals aged 17 and above with valid driver's licenses and knowledge of BEV technology. Out of 219 responses, 162 were fully completed and 57 were incomplete, with 145 responses deemed suitable after thorough cleaning and preparation. This sample size aligns with Malhotra et al.'s (2020) recommendation for exploratory studies, providing a solid foundation for analysis. The demographic profile reveals a predominance of male respondents (78%) and a diverse age distribution, with a significant number being over 45 years old. Geographically, the sample is predominantly from Jakarta (71.72%), with most respondents coming from the island of Java.

Reliability and Validity Testing

In this analysis, SPSS was utilized to assess the reliability and validity of the questionnaire. Reliability was evaluated using Cronbach's Alpha, which measures the internal consistency of the items. Values greater than 0.6 indicated acceptable reliability, with most variables meeting this criterion. Validity was assessed through the Pearson model, which confirmed that the correlations between variables supported the theoretical constructs being measured, with all correlation values ranging from 0.513 to 0.935.

Confirmatory Factor Analysis (CFA) was employed to validate the measurement model for BEV adoption intentions. The KMO value of 0.846 and significant Bartlett's Test results indicated a suitable sample size and significant variable correlations, allowing for effective factor analysis. The Anti-Image Correlation and Communalities tests confirmed that all indicators had adequate scores, supporting the continuation of CFA. However, the Rotated Component Matrix revealed that some variables, like Low Noise and Acceleration, were divided into multiple components, leading to the exclusion of indicators with low scores to enhance the reliability of the findings. This process refined the analysis, providing clearer insights into factors influencing BEV adoption intentions among Indonesian residents.

Descriptive Statistics

Descriptive statistics were employed to analyze respondents' attitudes toward various factors influencing BEV adoption. The mean scores, standard deviations, and frequency distributions provided insights into perceptions across different variables. For instance, the analysis of Range and Charging showed a generally positive attitude with an average mean of 3.447, indicating agreement with BEV charging aspects despite notable variability in responses. Similarly, Low Noise and Acceleration factors also received favorable ratings, with means of 3.979 and general agreement from respondents. However, the Price analysis revealed a consensus that BEV costs are perceived as too high, suggesting it as a significant barrier to adoption. Perceived Benefits and Incentives

were viewed positively, with many respondents agreeing on the influence of benefits and ease of obtaining incentives on their adoption intentions. Conversely, the Infrastructure analysis indicated challenges in accessing necessary support, reflected by a slightly negative mean score. Finally, respondents demonstrated a moderate intention to adopt BEVs, with an average score of 3.334, highlighting a general preference tempered by uncertainty.

Table 1. Intention to Adopt BEVs

Variable	Indicator	Mean	Standard deviation	Variable	Indicator	Mean	Standard deviation
Distance and Charging	RC1	3.752	0.979	**Price**	PR1	3.869	0.919
	RC2	3.759	0.889		PR2	3.579	0.922
	RC3	2.821	1.137		PR3	3.745	0.931
	RC4	3.455	1.017		PR4	3.366	0.877
Low Noise	SR1	4.097	0.897	**Perceived Benefits**	BN1	3.793	0.901
	SR2	4.014	0.947		BN2	3.421	1.055
	SR3	3.779	0.965	**Incentive**	IN1	3.890	0.789
	SR4	3.738	0.961		IN2	3.531	0.823
	SR5	3.607	0.857		IN3	3.269	0.896
Acceleration	AC1	3.979	0.669	**Infrastructure**	IF1	2.690	0.906
	AC2	3.986	0.695		IF2	2.648	0.883
	AC3	3.972	0.770		IF3	3.959	0.862
Security and Reliability	SF1	3.655	0.842	**Intention to Adopt BEV**	ADOPT1	3.552	0.822
	SF2	3.828	0.727		ADOPT2	3.159	0.930
	SF3	3.703	0.780		ADOPT3	3.290	0.946
	SF4	3.752	0.738				
	SF5	3.400	0.874				
	SF6	3.607	0.736				

Assumption testing

Assumption testing was conducted to ensure the validity and reliability of the statistical analyses in this study. The Multicollinearity test confirmed that all variables met the tolerance and VIF criteria, with tolerance scores above 0.100 and VIF scores below 10.00, indicating no severe multicollinearity issues. Normality was assessed using a P-P Plot, which showed that the regression residuals approximately followed a normal distribution, thus supporting the normality assumption. The One-Sample Kolmogorov-Smirnov Test also validated this with an Asymp. Sig. score of 0.085, exceeding the threshold of 0.05. Additionally, the Glejser Heteroskedasticity Test demonstrated that heteroskedasticity was not a concern, with scores ranging from 0.013 to 0.653 and scatter plot patterns supporting the validity of the regression results. These tests collectively affirm the robustness of the research findings and the appropriateness of the statistical methods employed.

Hypotheses Testing

The Hypotheses Testing process evaluates factors influencing BEV adoption intentions in Indonesia. It involves developing hypotheses, defining null and alternative statements, and gathering information through surveys. Statistical analysis, particularly regression analysis, is used to determine the relationships between independent variables and BEV adoption intentions. The F Test is used to determine if the variances of two

populations or samples are equal. A score below 0.05 indicates that the independent variable has a significant effect on the dependent variable. And with a score of 0.000, it is considered that the 8 factors have a significant effect on Intention to Adopt BEV. The F Test is then used to compare data to what is expected under hypothesis by comparing the means of two samples.

Table 2. F Test

Variable	Indicator	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
(Constant)		0,497	0,440		1,129	0,261
Range and Charging	RCMEAN	0,118	0,076	0,123	1,548	0,124
Low Noise	SRMEAN	0,140	0,073	0,141	1,918	0,057
Acceleration	ACMEAN	-0,145	0,090	-0,124	-1,606	0,111
Safety and Reliability	SFMEAN	0,393	0,106	0,334	3,698	0,000
Price	PRMEAN	-0,101	0,084	-0,078	-1,198	0,233
Perceived Benefits	BNMEAN	0,309	0,066	0,356	4,674	0,000
Incentives	INMEAN	0,083	0,062	0,090	1,338	0,183
Infrastructure	IFMEAN	0,006	0,068	0,006	0,086	0,931

The regression analysis assessed the impact of various factors on the intention to adopt Battery Electric Vehicles (BEVs). The results indicate that Safety and Reliability and Perceived Benefits significantly influence BEV adoption intentions, with both factors showing statistically significant positive effects (Sig. = 0.000). Conversely, the factors related to Range and Charging, Low Noise, Acceleration, Price, Incentives, and Infrastructure did not demonstrate significant effects, with p-values exceeding the 0.05 threshold. Low Noise was marginally significant (Sig. = 0.057), suggesting a trend towards a positive impact, but overall, it did not achieve statistical significance. These findings highlight the critical role of Safety and Reliability and Perceived Benefits in driving BEV adoption, while other factors either do not significantly affect adoption or require further investigation to determine their impact.

This is followed by a multiple linear regression analysis aimed to evaluate how various factors influence Indonesians' intentions to adopt Battery Electric Vehicles (BEVs). The regression equation:

$$Y=0.497+0.118(RCMEAN)+0.140(SRMEAN)-0.145(ACMEAN)+0.393(SFMEAN)-0.101(PRMEAN)+0.309(BNMEAN)+0.083(INMEAN)+0.006(IFMEAN)+\epsilon$$

Which reveals that Safety and Reliability (SFMEAN) and Perceived Benefits (BNMEAN) are the most significant factors, with positive coefficients of 0.393 and 0.309 respectively, and both showing statistical significance (Sig. = 0.000). Conversely, factors such as Range and Charging (RCMEAN), Low Noise (SRMEAN), Acceleration (ACMEAN), Price (PRMEAN), Incentives (INMEAN), and Infrastructure (IFMEAN) exhibit less pronounced or non-significant effects. Range and Charging, Low Noise, and Acceleration show marginally or non-significant impacts, while Price, Incentives, and Infrastructure do not significantly influence BEV adoption. The analysis suggests that enhancing perceptions of Safety and Reliability and Perceived Benefits could effectively

promote BEV adoption, whereas other factors require additional focus to improve their impact.

Results Interpretation and Study Comparison

The analysis of BEV adoption intentions in Indonesia reveals a nuanced picture when compared to previous research. Specifically, the hypothesis that Range and Charging would positively affect adoption is not supported (Sig. = 0.124), diverging from Higueras-Castillo et al. (2021), who identified these factors as strong predictors. This discrepancy could stem from regional differences in infrastructure and consumer priorities, where factors like road conditions and traffic congestion in Indonesia might diminish the perceived importance of charging infrastructure. Similarly, while Low Noise shows a marginally significant positive trend (Sig. = 0.057), it suggests that, although Indonesian consumers appreciate this feature, it is not as compelling as other factors. This aligns with global trends but indicates that other variables might play a more dominant role in influencing adoption.

Acceleration, which was found to positively influence adoption in Higueras-Castillo et al. (2021), does not have a significant effect in Indonesia (Sig. = 0.111). This could reflect regional differences in driving habits where performance features like acceleration may be less prioritized compared to cost and reliability. Conversely, Safety and Reliability emerge as significant positive influences on BEV adoption (Sig. = 0.000), consistent with Castillo et al.'s findings that emphasize these factors' critical role. Price, despite being a recognized barrier globally, does not show a significant impact on adoption intentions in Indonesia (Sig. = 0.233), underscoring its persistent role as a barrier. Perceived Benefits, however, are strongly positively correlated with adoption intentions (Sig. = 0.000), aligning with global consensus on the importance of environmental benefits and cost savings. Incentives and Infrastructure both show insignificant effects (Sig. = 0.183 and 0.931, respectively), suggesting that current incentives might be insufficient or poorly communicated and that infrastructure concerns may not be as pronounced or might be perceived as a barrier by consumers.

Conclusion

The conclusion highlights that while Indonesian attitudes toward Battery Electric Vehicles (BEVs) show promise, they are tempered by concerns about price, infrastructure, and incentives. Consumers in Indonesia place high importance on safety and reliability, which aligns with global trends. The benefits of BEVs, including environmental advantages and cost savings, are recognized, but infrastructure issues and high initial costs remain significant barriers. Unlike other regions, Indonesian consumers appear less influenced by range and charging infrastructure, possibly due to local conditions and infrastructure limitations. Performance features like acceleration are less critical in driving adoption, and the impact of incentives is currently insufficient. To enhance BEV adoption, recommendations include improving the visibility and accessibility of charging infrastructure, focusing marketing on reliability and cost savings, advocating for financial incentives and subsidies, and better communicating the benefits and incentives related to BEVs. Tailored strategies that address these specific regional challenges and leverage existing positive attitudes will be crucial for increasing BEV adoption in Indonesia.

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