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Factor Influencing Indonesian Consumer Intention to Adopt Electric Vehicle

I Gusti Agung Dharmayana[a*], Enggar Laksito Ardhi[b], Henky Wibowo[c], Ina Agustini Murwani[d]

[abcd]Management Department, BINUS Business School Master Program, Bina Nusantara University, Jakarta, Indonesia

**Corresponding author e-mail: i.dharmayana@binus.ac.id*

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ABSTRACT

Electric vehicles (EVs) have become a new trend in Indonesia, despite low penetration rates. While EVs are promoted as a solution to environmental issues, the primary motivations for consumer purchase remain unclear. This chapter analyses the factors influencing Indonesian consumers' purchase intentions, specifically examining environmental attitudes, economic benefits, charging risks, technological risks, and policy incentives. Data were collected from a survey of 200 respondents and analysed using SEM-PLS. This chapter concludes that environmental factors are not significantly related to EV adoption intention; the dominant drivers are economic factors and risk perception. Furthermore, policy incentives were found not to moderate the relationship between these variables and adoption intention. The implications from this chapter include the need for stronger policies, enhanced charging infrastructure, improved after-sales services, and public education campaigns to increase EV adoption in Indonesia.

INTRODUCTION

The transition to electric vehicles (EVs) has emerged as a solution to reduce carbon emissions, a key contributor to air pollution in Indonesia. In cities like Jakarta, Bandung, and Surabaya, the transportation sector is responsible for high levels of carbon monoxide (CO), nitrogen oxide (NOx), and particulate matter (PM2.5), all of which pose health risks (Cardenas et al., 2022). The urgency of this transition is underscored by the fact that the transportation sector contributes approximately 21.9% of emissions from energy activities, with greenhouse gas (GHG) emissions increasing by 10% in 2022 to reach 158,983 Gg CO2e (Case for Southeast Asia, 2024). EVs are seen as an environmentally friendly alternative to fossil fuel-based transportation, and it is crucial for mitigating pollution in urban centers. To accelerate EV adoption, the Indonesian government has introduced various policies, such as the Minister of Finance Regulation No. 8 of 2024, which provides tax incentives for electric vehicles (AC Ventures, 2023). This shift is also driven by energy security concerns as domestic fuel consumption reached 80.29 million kiloliters in 2023, while refinery production was only 43.87 million kiloliters, forcing a heavy reliance on imports and increasing the national budget burden (Case for Southeast Asia, 2024). Despite these efforts, the adoption rate remains limited. A stark gap exists between the government's ambitious target of 15 million EVs by 2030 in the Enhanced Nationally Determined Contribution (NDC) and the reality of only 107,000 units circulating as of late 2023 (Case for Southeast Asia, 2024).

The adoption of electric vehicles has been widely researched particularly in developed countries (Krishnan & Koshy, 2021a; Kumar & Alok, 2020a) Previous studies have emphasized the importance of environmentally friendly attitudes in influencing consumer decisions to adopt EVs. Awareness of climate change, support for environmentally friendly technology, and the desire to reduce pollution are significant motivators in shaping consumer EV Adoption Intentions (Krishnan & Koshy, 2021a) further revealed that consumers with an environmentally friendly attitude are more likely to adopt environmentally friendly technologies like EVs. (Gunawan Dan Putri (2020) found that the environmental benefits of EVs, including reduced CO^2 emissions and improved air quality, greatly influence consumer choices. Economic savings, such as reduced fuel and maintenance costs, also serve as strong incentives for consumers to transition to EVs, offering long-term economic advantages (Krishnan & Koshy, 2021a).

Although many studies address factors influencing EV adoption, much of the research has been focused on developed countries. Research on EV adoption in Indonesia hasn’t revealed the real factors that primarily influenced the adoption of EV. To address this gap this study targets Indonesia's primary economic hubs—specifically Jakarta, West Java, Central Java, East Java, and Bali—which serve as the epicenters of EV infrastructure. This selection is justified by the distribution of charging stations (SPKLU), where Bali leads with 403 units, followed by West Java with 324 units, Jakarta (Jaya) with 262 units, East Java with 161 units, and Central Java with 132 units (Case for Southeast Asia, 2024)Several benefits and policies such as tax incentives have been introduced by the government. However, the effectiveness of these

policies in encouraging widespread EV adoption remains underexplored. Furthermore, EVs offer a high 'well-to-wheel' energy efficiency of 73%, compared to only 13% for conventional vehicles using green fuels, making their successful adoption critical for national energy management (Case for Southeast Asia, 2024). This research seeks to explore the antecedents of Indonesian consumers' intention to adopt electric vehicles by combining both consumer behaviours the advancement of technology and government supports. This research focuses on the effects of environmentally friendly attitudes, perceived economic benefits, the influence of charging and technology risks and the impact of policy incentives on EV adoption especially given current infrastructure limitations. While pro-environmental factors are often cited as drivers in developed economies, their actual impact in the Indonesian context remains a significant research gap. This study specifically addresses this gap by examining whether environmental altruism is sidelined by pragmatic economic benefits and policy intervention. This research also explores the role of policy incentives as both independence and moderating variables, because policy incentive is the only variable that has been used as independence and moderator in the previous research (Bryła et al., 2023a) Besides that, this research aims to investigate which role has stronger influence on the adoption of EV.

H1 Environmentally Friendly Attitude positively influences EV Adoption Intention. An environmentally friendly attitude plays a significant role in shaping consumer decisions to adopt electric vehicles (EVs) as they are seen as an environmentally friendly alternative to fossil fuel vehicles. Research consistently shows that environmentally friendly attitudes encourage consumers to reduce carbon emissions and improve air quality by choosing EVs (Kumar & Alok, 2020b) . Consumers who are more aware of the environmentally benefits of EVs are more likely to transition from fossil fuel vehicles (Krishnan & Koshy, 2021). Support for environmentally friendly technologies correlates closely with consumers' intentions to purchase EVs (Bryła et al., 2023a) Gunawan Dan Putri (2020) suggest that environmentally friendly attitudes are strong predictors of EV adoption decisions as they align with sustainability goals.

H2 Economic Benefit positively influences EV Adoption Intention. Economic benefits such as savings on fuel and vehicle maintenance, are crucial in motivating consumers to adopt electric vehicles. Studies show that EVs help reduce operating costs, particularly fuel and maintenance expenses, which influences consumer EV Adoption Intentions (Bryła et al., 2023a; Krishnan & Koshy, 2021a). (Helveston et al., 2015) highlight that economic incentives, such as tax reductions and subsidies, help reduce initial purchase costs and encourage EV adoption. Furthermore, technologies like vehicle-to-grid offer long-term cost savings.

H3 Eco-friendly Benefit positively influences EV Adoption Intention. Eco-friendly benefits such as reduced carbon emissions and improved air quality, significantly influence consumers' willingness to adopt EVs. Consumers who are concerned about environmentally issues tend to choose green technologies like EVs, which help reduce air pollution and greenhouse gas emissions (Krishnan & Koshy, 2021b; Rezvani et al., 2015). Research by (Bryła et al., 2023) and

(Huang & Ge, 2019a) support this, showing that environmentally awareness leads to greater adoption of EVs in markets with high environmentally concern.

H4 Charging Risk positively influence EV Adoption Intention. Charging risks including concerns about infrastructure and long charging times, negatively influence consumers' intention to adopt EVs. (Helveston et al., 2015) state that consumers accustomed to quick refuelling times for fossil fuel vehicles are deterred by the longer charging times required for EVs. (Sierzchula et al., 2014) emphasize that limited charging stations reduce EV adoption particularly in areas with few facilities.

H5 Technological Risk positively influence EV Adoption Intentions. Technological risks such as concerns about battery life and replacement costs, also hinder EV adoption. Despite the benefits of EVs, many consumers are wary of the reliability of EV technology, especially the long-term durability of batteries (Helveston et al., 2015; Sierzchula et al., 2014). (Krishnan & Koshy, 2021b) note that perceived technological risks discourage consumers from transitioning to EVs.

H6 Policy Incentives positively influence EV Adoption Intention. Policy incentives (tax reductions, subsidies, and infrastructure development) positively impact consumers' intention to adopt electric vehicles (EVs). These fiscal incentives reduce the perceived financial barriers to EV adoption by lowering both the initial purchase cost and maintenance expenses. Research has shown that such incentives make EVs more affordable and accessible, encouraging potential buyers to consider them as a viable option (Hasudungan et al., 2024). Furthermore, infrastructure development, such as the availability of EV charging stations significantly influences consumer intention to adopt EVs, enhancing their feasibility and convenience (Hasudungan et al., 2024). By offering these incentives, government policies can effectively stimulate consumer demand for EVs in smart cities.

H7a Policy Incentive positively moderates Environmentally Friendly on EV Adoption Intention. Economic benefits such as savings on fuel and maintenance costs are one of the main drivers of EV adoption (Krishnan & Koshy, 2021). However, these long-term benefits are often offset by high initial purchase costs. Policy incentives play a moderating role. Fiscal incentives such as purchase subsidies and tax exemptions directly reduce the initial purchase cost burden for consumers (He & Hu, 2024). EV subsidies in the metropolitan city of Jakarta have a positive and significant effect on EV adoption, indicating that consumers react positively to policy efforts to reduce upfront costs (Hasudungan et al., 2024). With the reduction of financial barriers to upfront payments, consumers can focus more on the long-term economic benefits offered by EVs. As a result of government policy incentives, perceptions of economic benefits become stronger and more influential on adoption intentions (He & Hu, 2024). These government incentives make the calculation of economic benefits much more attractive to potential consumers (Sierzchula et al., 2014; He & Hu, 2024).

H7b Policy Incentives positively moderate the influence of pro-environmental attitudes on EV adoption intentions. Pro-environmental attitudes encourage individuals to choose more

environmentally friendly technologies such as EVs (Huang & Ge, 2019a). There is a gap between attitudes and actual behavior (*attitude-behavior gap*) where a person's good intentions are not translated into action due to cost barriers. Non-fiscal policies such as exemptions from traffic regulations (e.g., odd-even) and the provision of special parking spaces can serve as reinforcers (Krishnan & Koshy, 2021b). By providing daily conveniences and benefits as rewards for pro-environmental choices, the government sends a strong signal that such behavior is supported. This can reinforce consumers' belief that their actions are in line with their personal values and are also supported by the authorities, thereby encouraging the conversion from a merely positive attitude to a concrete intention to adopt (Chatterjee et al., 2024).

H7c Policy Incentives positively moderate the influence of environmental benefits on EV adoption intentions. Perception that EVs can reduce emissions and improve air quality is one of their main attractions (Putri & Gunawan, 2020). When the government actively promotes EVs through various incentives, this reaffirms the urgency and importance of the environmental benefits offered by EVs. Consumers will feel that their choice to adopt EVs is not only an individual contribution, but also part of a larger collective movement supported by the state. This external reinforcement makes the perceived environmental benefits more relevant and influential in decision-making, especially when consumers are aware that the government is also actively working to create a supportive ecosystem (Hasudungan et al., 2024).

H7d Policy Incentives negatively moderate the influence of charging risks on EV adoption intentions. Charging risks which include concerns about the availability and accessibility of charging stations, are one of the main barriers to EV adoption (Krishnan & Koshy, 2021a). Non-financial policy incentives, particularly the government's commitment to developing infrastructure, play an important role in mitigating these risks. The availability of EV infrastructure in metropolitan cities is a factor that is significantly considered by potential users (Hasudungan et al., 2024). Although some studies show public skepticism about the realization of policy promises (Krishnan & Koshy, 2021a) evidence of infrastructure development by the government can directly reduce risk perception. These policy incentives can alleviate consumer anxiety (range anxiety), thereby weakening the negative influence of charging risks on adoption intentions (Chatterjee et al., 2024).

H7e Policy Incentives negatively moderate the influence of technological risk on EV adoption intentions. Technological risks such as concerns about battery durability and battery replacement costs are important considerations for consumers (Putri & Gunawan, 2020). Government policy incentives, especially financial ones such as subsidies and tax reductions, serve as risk mitigation. Prospective consumers in the metropolitan city of Jakarta respond positively to policy efforts that reduce initial and maintenance costs (Hasudungan et al., 2024) . By reducing the initial investment required, potential future financial losses due to technological problems (replacing batteries) become less significant. These policy incentives act as a “financial

cushion" that reduces the weight of technological risk in the decision-making process, thereby reducing the negative influence of this risk on adoption intentions (Septian Romas et al., 2022).

RESEARCH FRAMEWORK. This research model aims to provide a comprehensive understanding of the factors influencing the adoption of electric vehicles (EVs) in Indonesia. The objective is to explore how environmentally friendly attitudes, economic benefits, and environmentally benefits, charging risks and technology risks affect consumers' intention to adopt EV and the role of government policy incentives as moderating effect. The proposed research framework is illustrated in Figure 1 research framework.

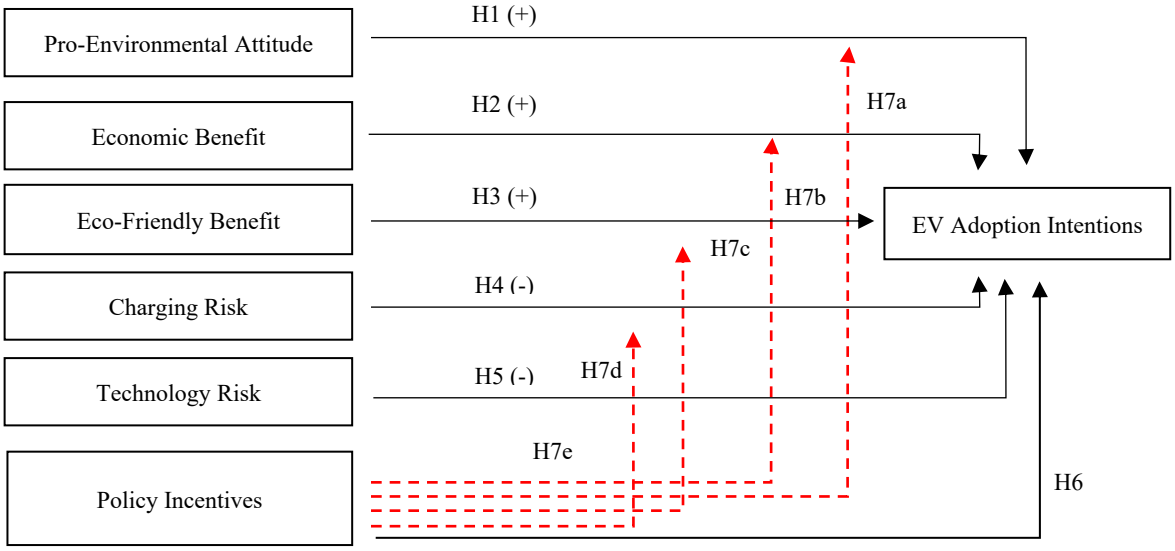

Figure 1. Research Framework

RESEARCH METHODS

This study employed a quantitative research design using a questionnaire to examine the influence of environmentally friendly attitudes, economic benefits, eco-friendly benefits, charging risks, technological risks and policy incentive on consumers' intention to adopt electric vehicles (EVs) with policy incentive as a moderating variable. Data were collected in May 2025 through an online survey from consumers in major cities across Indonesia, where EV infrastructure is actively developing. The analysis used Structural Equation Modeling (SEM)-PLS to test relationships.

The population for this study consists of Indonesian consumers who were familiar with EVs and had the intention adopt EVs. However, the exact population size of potential EV adopters in Indonesia is unknown. Official national reports primarily track realized EV sales—which reached 107,000 units by late 2023—and macro-level projections, such as the government's target of 15 million EVs by 2030, rather than maintaining specific demographic statistics on consumers' purchase intentions (Case for Southeast Asia, 2024).

To address this, participants were selected using a purposive sampling technique (Palinkas et al., 2015). This method allowed for the strategic selection of respondents who met three specific criteria: (a) consumers who own a private vehicle, (b) consumers familiar with EVs, and (c) consumers residing in urban areas with developing EV infrastructure such as Jakarta, Bandung, Bali, Yogyakarta, and Makassar. These cities were selected to represent Indonesia's national context as they serve as the country's primary economic and population centers, where EV infrastructure development and government promotion programs are most active (Syahputro & Abdul Hadi, 2024). Furthermore, these regions possess the highest concentration of Public EV Charging Stations (SPKLU) nationally; for instance, Bali has 403 units, West Java has 324 units, and Jakarta has 262 units (Case for Southeast Asia, 2024). Targeting these specific infrastructure-ready hubs provided a highly valid proxy for urban consumer behavior across Indonesia during the early adoption phase of sustainable mobility (Hasudungan et al., 2024).

The research questionnaire instrument was adapted from prior validated studies on EV adoption and green technology acceptance. Specifically, indicators for Environmentally Friendly Attitude, Economic Benefit, Technological Performance Risk, and EV Adoption Intention were adapted from (Krishnan & Koshy, 2021b); Eco-Friendly Benefit from (Putri & Gunawan, 2020); and Charging Risk and Policy Incentives from (Huang & Ge, 2019b). Modifications were made to fit the Indonesian context to capture data on the respective variables. Each variable was measured using a 5-point Likert scale.

Data analysis used SEM-PLS version 4. To assess the validity and reliability of the research instrument, a Measurement Model Test (Outer Model) was conducted. This evaluation was carried out through convergent validity testing, reliability testing, and descriptive statistics of each measurement item, such as Mean and Standard Deviation. Descriptive statistical analysis of measurement items was utilized to provide an initial context to respondents' perceptions and serve as supporting data for EV adoption in Indonesia. Convergent validity, which refers to the extent to which indicators designed to measure the same construct consistently capture the concept in question, was evaluated. According to (Hair, 2022) the minimum threshold for good convergent validity is that the Average Variance Extracted (AVE) value is greater than 0.5 and the loading factor is above 0.7. Furthermore, reliability was tested by ensuring Cronbach's Alpha and Composite Reliability values were greater than 0.7. Following this, the inner model assessed path coefficients and p-values (< 0.05) for significance, along with R-squared (R^2) values to measure the explanatory power of the model (Hair, 2022).

RESULTS & DISCUSSION

This study investigates the key factors influencing Indonesian consumers' intention to adopt electric vehicles (EVs). The research model aims to evaluate the impact of several variables with environmentally friendly attitude can influence the intention to adopt EVs. The study also examines the role of perceived benefits including economic and environmental advantages in

shaping consumers' adoption intentions. Furthermore, it explores the effect of perceived risks, particularly those related to charging infrastructure and technological concerns on the decision to adopt EVs. The research integrates the influence of policy incentives testing both their direct positive impact on adoption intention and their role as a moderating factor that influences the relationship between other key variables and EV adoption.

Respondent characteristics are presented to understand the demographic profile and behavior towards electric vehicle (EV) adoption. Table 1 presents the key demographic characteristics of the 200 respondents in this study.

Table 1. Respondent Characteristics

Descriptive Data	Description	Number	Percentage
Residence	Greater Jakarta	123	61.5%
	Bandung	18	9.0%
	Semarang	12	6.0%
	Yogyakarta	8	4.0%
	Surabaya	12	6.0%
	Bali	9	4.5%
	Makassar	8	4.0%
	Terrain	10	5.0%
Age	< 25 years	17	8.5%
	25–34 years	106	53%
	35–44 years	65	32.5
	> 45 years	12	6.0%
Gender	Male	127	63.5%
	Female	73	36.5%
Education	High School/Equivalent	8	4.0%
	Diploma	15	7.5%
	Bachelor’s Degree	167	83.5%
	Master’s Degree	6	3.0%
	Doctorate Degree	4	2.0%
Income	< IDR 10 million	39	19.5%
	IDR 10–20 million	97	48.5%
	IDR 20–30 million	36	18.0%
	> IDR 30 million	28	14.0%

Source: Research Data (Processed), 2025

Based on the demographic data in Table 1; most respondents are from Greater Jakarta (61.5%) followed by Bandung (9%), Surabaya (6%), Semarang (6%), and other cities like Yogyakarta, Bali, Makassar, and Medan which have emerging EV infrastructure. Most respondents’ age are

25–34 years (53%) and 35–44 years (32.5%). Sixty three percent (63.5%) is male respondents and female respondents account for 36.5%. The majority hold a bachelor's degree (83.5%) followed by Diploma (7.5%) and High School (4%). 48.5% of respondents earn between IDR 10–20 million and the rest ranges below IDR 10 million and above IDR 30 million indicating diverse purchasing power relevant to the EV market. Overall, the respondents represent an urban, tech-aware group with varying income levels and strong educational backgrounds aligned with EV adoption trends in Indonesia. The detailed demographic profile of respondents is presented in Table 2.

Table 2. Validity Test and Descriptive Statistics Results

Variable	Mean	SD	Loading Factor	AVE	Sources
EV Adoption Intention (EVA)					
The intention to purchase an electric vehicle (EV) soon.	3,84	0,84	0,87		
Tendency to choose EV over fossil fuel vehicles.	3,90	0,83	0,86		
Readiness to pay more for an EV due to environmental benefits.	3,82	0,82	0,88	0,762	(Krishnan & Koshy, 2021b)
Willingness to recommend EV to others.	3,89	0,86	0,87		
Intention to replace a conventional vehicle with an EV within a certain time frame.	3,90	0,84	0,86		
I am willing to buy an EV soon.	3,84	0,84	0,87		
Environmentally Friendly Attitude (EFA)					
Awareness of the importance of protecting the environment.	3,86	0,97	0,87		
Belief that individual actions can reduce environmental damage.	4,15	0,69	0,86	0,759	(Krishnan & Koshy, 2021a)
Support for environmentally friendly technology.	4,14	0,70	0,87		
Positive view that EVs can reduce air pollution.	4,15	0,71	0,87		
Concern about climate change and the role of technology in mitigation.	4,12	0,67	0,86		
Economic Benefit (EB)					
Fuel cost savings from using an EV.	3,87	0,88	0,90		
Reduced overall vehicle maintenance costs.	3,84	0,90	0,89		
The perception is that EVs have lower operational costs than fossil fuel vehicles.	3,80	0,82	0,87	0,746	(Krishnan & Koshy, 2021a)
Long-term benefits of EV operational costs.	4,16	0,67	0,83		
Comparison of total usage costs between EVs and conventional vehicles.	4,13	0,70	0,80		

Variable	Mean	SD	Loading Factor	AVE	Sources
Eco-Friendly Benefit (EFB)					
The perception is that EVs reduce carbon emissions.	3,84	0,92	0,90	0,758	(Putri & Gunawan, 2020)
The belief is that EVs are more environmentally friendly than conventional vehicles.	4,12	0,69	0,89		
View that using EVs improves air quality.	4,11	0,70	0,87		
Awareness that EVs contribute to climate change mitigation.	4,16	0,70	0,83		
The perception that EV usage supports environmentally sustainability.	4,13	0,69	0,80		
Charging Risk (CR)					
Availability of charging stations around the residential area.	3,87	0,87	0,88	0,776	(Huang & Ge, 2019)
Limited number of charging stations in certain areas.	3,89	0,83	0,88		
Time required to fully charge an EV.	3,87	0,89	0,89		
Ease of access to charging stations.	3,84	0,90	0,87		
The perception is that the EV charging infrastructure is inadequate.	3,84	0,85	0,87		
Technological Performance Risk (TPR)					
Concerns about the EV battery lifespan.	3,86	0,84	0,86	0,761	(Krishnan & Koshy, 2021a)
Perceived high costs of battery replacement.	3,83	0,85	0,87		
Worries about the long-term performance of EV technology.	3,82	0,84	0,87		
Risk related to malfunctions or breakdowns of EV technology.	3,86	0,87	0,87		
Belief in the limitations of EV technology compared to conventional vehicles	3,85	0,89	0,86		
Policy Incentives					
Tax incentives provided by the government for EV purchase.	3,88	0,87	0,87	0,762	(Huang & Ge, 2019)
Perception that the government offers subsidies for EV purchases.	3,85	0,81	0,86		
Government's role in developing charging infrastructure.	3,84	0,84	0,88		
Elimination of motor vehicle tax for EVs.	3,80	0,87	0,87		
Government support in promoting EV usage to the public.	3,87	0,86	0,86		

Source: Research Data (Processed), 2025

All indicators for the seven constructs—Environmentally Friendly Attitude (EFA), Eco-Friendly Benefit (EFB), Economic Benefit (EB), Charging Risk (CR), Technological Performance Risk (TPR), Policy Incentive (PI), and EV Adoption Intention (EVA)—met the convergence validity criteria with AVE (Average Variance Extracted) values ranging from 0.746 to 0.776 and all loading factors exceeding the limit of 0.7. Statistically descriptive, the measured data showed strong and consistent respondent approval, where the Mean value ranged from 3.84 to 4.16 and the Standard Deviation (SD) value was mostly below 0.90 confirming that each indicator accurately and consistently reflected its respective constructs, thus validating the measurement model used in the study.

Reliability Test was evaluated using two metrics Cronbach's Alpha and Composite Reliability which measure how consistently the indicators reflect their respective constructs. Cronbach's Alpha indicates the lower bound of reliability, while Composite Reliability is considered more accurate in estimating internal consistency (Hair, 2022). The results of the reliability test conducted to assess the internal consistency of the latent variables in the measurement model are presented in Table 3 Reliability Test.

Table 3 Reliability Test

Variable	Cronbach's Alpha	Composite Reliability
Charging Risk (CR)	0,928	0,945
Eco-Friendly Benefit (EFB)	0,921	0,940
Economic Benefit (EB)	0,916	0,936
Policy Incentive (PI)	0,923	0,942
Environmentally Friendly Attitude (EFA)	0,923	0,940
EV Adoption Intention (EVA)	0,922	0,941
Technological Performance Risk (TPR)	0,921	0,941

Source: Research Data (Processed), 2025

According to (Hair, 2022) values greater than 0.7 for both metrics suggest good reliability. As shown in Table 4 all variables meet these criteria with Composite Reliability values ranging from 0.936 for Economic Benefit to 0.945 for Charging Risk. These results confirm that the indicators for each variable—Charging Risk (CR), Eco-Friendly Benefit (EFB), Economic Benefit (EB), Policy Incentive (PI), Environmentally Friendly Attitude (EFA), EV Adoption Intention (EVA), and Technological Risk (TPR)are reliable and consistent, ensuring the robustness of the measurement model for further analysis.

Multicollinearity Test Before testing the structural model the multicollinearity test was performed by looking at the VIF (*Variance Inflation Factor*) value for each independent variable. The criteria that must be met are that the VIF value must be below the conservative threshold

of 5.0. The analysis showed that all independent variables in the model, including the interaction variables, were free from multicollinearity problems. The detailed VIF values for each construct are presented in Table 4 Multicollinearity Test.

Table 4 Multicollinearity Test

Construct	Variance Inflation Factor (VIF) Range
Charging Risk (CR)	2,094 – 2,570
Economic Benefit (EB)	1,437 – 2,605
Environmentally Friendly Attitude (EFA)	1,408 – 1,760
Eco-Friendly Benefit (EFB)	1,403 – 1,799
EV Adoption Intention (EVA)	2,083 – 2,455
Policy Incentive (PI)	2,078 – 2,441
Technological Risk (TR)	2,339 – 2,850
Moderating Effects (Interaction Variables)	1,000

Source: Research Data (Processed), 2025

The results of the multicollinearity test showed that the highest VIF was 2,850 (on item TR3) and the VIF for all interaction variables (moderating effect) had a value of 1,000 (perfect value). Since all VIF values are well below 5.0, it can be concluded that the structural model is ready to be tested and the resulting path coefficient estimates are unbiased and reliable.

Inner Model Test Results aims to test the causality relationship between constructs and assess the predictive ability of the model conducted through Determination Coefficient testing and Hypothesis Significance Test (Path Coefficient).

Coefficient of determination (R^2) test was examined to assess how well the independent variables explain variance in the dependent variable. An R-square value above 0.5 indicates moderate explanatory power in behavioral research. According to the statistical analysis, the EV Adoption Intention (EVA) variable yielded an R^2 value of 0.801. This indicates that 80.1% of the variance in Indonesian consumers' intention to adopt electric vehicles is collectively explained by the independent variables, including pro-environmental attitudes, economic benefits, perceived risks, and policy incentives. Furthermore, the model demonstrated high stability and predictive relevance, as evidenced by an Adjusted R^2 0.789. The remaining 19.9% of the variance is attributed to external factors not captured within the current research framework.

Hypothesis testing aims to determine whether the developed hypotheses are supported by empirical data. The decision to accept or reject each hypothesis is based on statistical significance, determined by the t-statistic and the corresponding p-value. A relationship is considered statistically significant if the p-value is less than 0.05. The comprehensive results are summarized in Figure 2 Hypothesis Test Results.

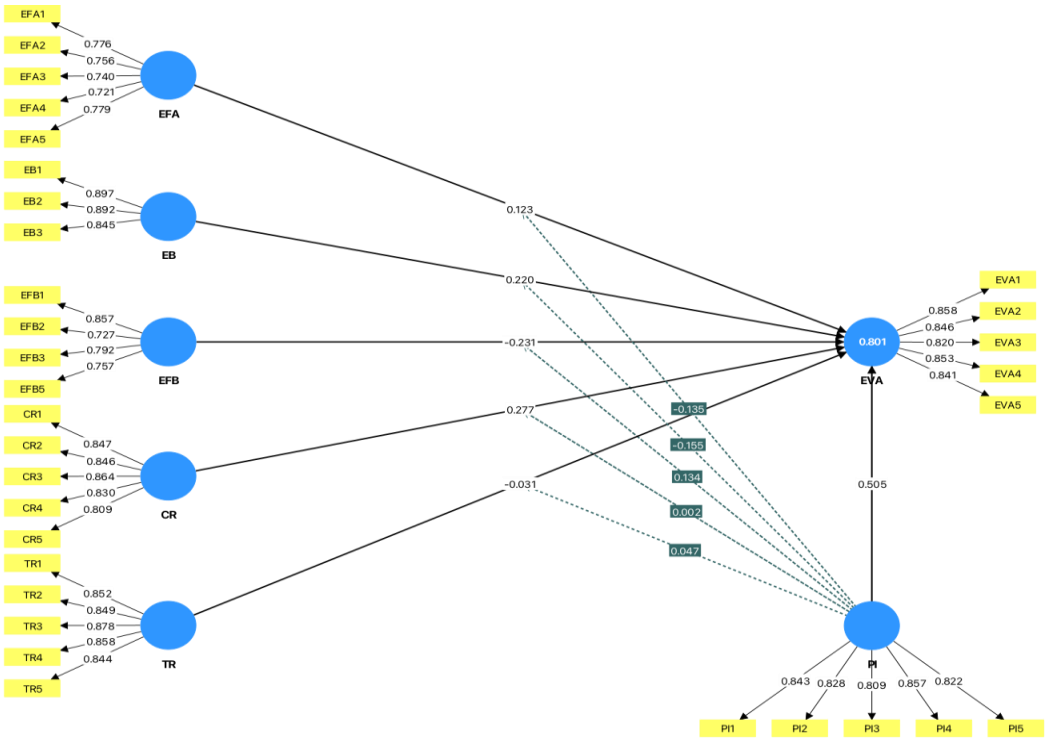

Figure 2 Hypothesis Test Results

Source: *Research Data (Processed),* 2025

Table 5 summarizes the complete results of the direct and moderating effects detailing the Path Coefficient, T-statistic, and P-value for all tested relationship.

Table 5 Hypothesis Results

Hypothesis	Path Coefficient	T-Stat	P-Value	Results
Environmentally Friendly Attitude →EV Adoption Intention	0,123	1,604	0,054	Rejected
Economic Benefit → EV Adoption Intention	0,220	3,078	0,001	Accepted
Eco-Friendly Benefit → EV Adoption Intention	-0,231	2,819	0,002	Rejected
Charging Risk → EV Adoption Intention	0,277	3,494	0,000	Rejected
Technology Risk → EV Adoption Intention	-0,031	0,368	0,357	Rejected
Policy Incentive → EV Adoption Intention	0,505	5,441	0,000	Accepted
Moderating Effect of Policy Incentive on Economic Benefit → EV Adoption Intention	-0,155	2,067	0,019	Rejected
Moderating Effect of Policy Incentive on Charging Risk → EV Adoption Intention	0,002	0,028	0,489	Rejected
Moderating Effect of Policy Incentive on Eco-Friendly Benefit → EV Adoption Intention	0,134	1,439	0,075	Rejected
Moderating Effect of Policy Incentive on Environmentally Friendly Attitude → EV Adoption Intention	-0,135	1,614	0,053	Rejected
Moderating Effect of Policy Incentive on Technology Risk → EV Adoption Intention	0,047	0,589	0,278	Rejected

Source: Research Data (Processed), 2025

H1 Environmentally Friendly Attitude on EV Adoption Intention. The results of the statistical analysis of environmentally friendly attitudes towards the intention to adopt EVs show a positive Path Coefficient (β = 0.123) but are not statistically significant with a p-value of 0.054 (p > 0.05) therefore hypothesis H1 is rejected. This empirical outcome addresses the research gap regarding the applicability of environmental altruism in the Indonesian market, suggesting that pro-environmental attitudes do not function as a primary driver for EV adoption in this specific context (Syahputro & Abdul Hadi, 2024). The hypothesis was rejected because it was based on measurements on the Environmentally Attitude (EFA1) item. Awareness of the importance of protecting the environment has a low average respondent answer score of 3.96 among all EFA measurement items, indicating that respondents are at the lower end of the agree category (3.41 – 4.20). Furthermore, the hypothesis was rejected because the EFA1 item had a high Standard Deviation (SD = 0.97) which proved that the respondents did not have a consensus or consistent answer regarding the basic foundation of pro-environmental attitudes. Indicating a lack of consensus and significant inconsistency among respondents regarding their foundational pro-environmental attitudes (Wang & Witlox, 2025). This phenomenon exemplifies the *attitude-behavior gap*, wherein passive environmental awareness fails to materialize into tangible purchasing actions (Putri & Gunawan, 2020). These findings align with recent empirical evidence from (Center for Strategic and International Studies, 2024) within the Indonesian context, which confirms that environmental concern often remains at the level of passive awareness rather than active consumer behavior. In the absence of a stable and robust foundation of environmental attitudes, this variable is insufficient to independently stimulate EV adoption intentions among urban consumers in Indonesia (Syahputro & Abdul Hadi, 2024).

H2 Economic Benefit on EV Adoption Intention. The results of statistical analysis for Economic Benefits on EV Adoption Intentions show a positive (Path Coefficient) (β = 0.220) and statistically significant value with a p-value of 0.001 (p < 0.05) therefore hypothesis H2 is accepted. These findings demonstrate that perceived economic advantages function as a primary catalyst for the intention to adopt electric vehicles in the Indonesian market (Putri & Gunawan, 2020) . The findings show that Economic Benefits are the main driver of EV adoption intentions in Indonesia. The results of the respondents' answers showed that the intention of adopting EV vehicles was driven by the reduction in fuel costs and maintenance costs shown where items EB1 (Fuel cost savings) and EB2 (Reduction in maintenance costs) both had an average value of 3.99 with a low standard deviation (SD) (0.88 - 0.90), proving the existence of a strong consensus among respondents regarding the financial benefits of EVs. This denotes a robust and consistent consensus among respondents regarding the tangible financial advantages associated with EV ownership, such as the efficiency of battery electric vehicles compared to internal combustion engines (Syahputro & Abdul Hadi, 2024). This finding highlights the distinct consumer behavior in the Indonesian market. The results are consistent with the broader body of literature on EV adoption in emerging markets which suggests that adoption is primarily driven by fiscal advantages (Krishnan & Koshy, 2021b) .It illustrates that consumers in developing nations exhibit a highly pragmatic approach, prioritizing direct financial metrics—such as the minimization of daily operational expenditures and tax-related savings—as the decisive

determinants in their adoption decision-making processes (Hasudungan et al., 2024). These economic considerations take precedence over environmental concerns, confirming that financial incentives are a stronger predictor of purchase intention in the Indonesian urban context (Syahputro & Abdul Hadi, 2024).

H3 Eco-Friendly Benefit on EV Adoption Intention. The results of the analysis for Environmental Benefits on EV Adoption Intentions show a significant **(**$p = 0.002$) but opposite (negative) effect ($\beta = -0.231$) on the intention to adopt electric vehicles thus hypothesis H3 is rejected**.** This paradoxical result is attributed to the conceptual discrepancy between the perceived collective benefits of the technology and the required personal financial commitment (Bryła et al., 2023b). The difference in the results of the hypothesis test is due to the difference in the type of benefit measured (collective) and the type of commitment requested (personal). The belief is that EVs are more environmentally friendly (with an average of 3.96) and (EFB3) view that using EVs improves air quality) with an average of 4.11 while the EVA item demands financial commitment such as the item (EVA) 'Readiness to pay more for an EV due to environmental benefits' with an average of 3.94). The significant negative path coefficient suggests that an overemphasis on collective ecological advantages may inadvertently underscore the high personal cost of adoption, thereby failing to stimulate purchase intention (Wang & Witlox, 2025) .This finding aligns with recent empirical evidence in Indonesia indicating that environmental awareness is often marginalized by pragmatic considerations during the decision-making process (Center for Strategic and International Studies, 2024) . It confirms that within the Indonesian market, environmental issues tend to exist only as passive awareness rather than as an active determinant for behavior transition (Syahputro & Abdul Hadi, 2024). Without a tangible alignment between personal economic gain and ecological benefits collective environmental altruism remains insufficient to drive the adoption of electric vehicles in the urban demographic (Putri & Gunawan, 2020).

H4 Charging Risk on EV Adoption Intention. The results of the analysis of charging risk on the adoption of electric vehicles show a significant effect ($p = 0.000$) but the hypothesis is rejected because the direction of the effect is opposite (positive). This outcome directly contradicts the hypothesized negative influence suggesting a unique consumer dynamic within the Indonesian context (Syahputro & Abdul Hadi, 2024). The difference in the results of the hypothesis test occurred because the majority of respondents that the risk of charging was indeed recognized collectively by the respondents, as indicated by items CR1 (Station availability) and CR2 (Limited number of stations with the average answer of the respondents being at 3.87 to 3.89 included in the category of agreeing with a low standard deviation value of 0.83. Such statistics prove that respondents possess a realistic and unified awareness of existing infrastructure limitations (Septian Romas et al., 2022). The positive path coefficient, despite the recognized risks, indicates that these constraints do not function as prohibitive barriers for the target demographic. This strongly suggests that the respondents possess the psychographic profile of early adopters who perceive charging risk as an *acceptable challenge* rather than a deterrent

(Bryła et al., 2023). Within this segment, the motivation to adopt emerging technology and the allure of innovation outweigh nascent infrastructure concerns. This interpretation is supported by (Bryła et al., 2023)who argued that early adopters typically exhibit a higher threshold for risk tolerance and are driven by the functional and symbolic value of pioneering new technological solutions. Thus, in Indonesia's major urban centers, the current market is composed of risk-tolerant consumers who anticipate infrastructure growth while remaining committed to adoption (Hasudungan et al., 2024).

H5 Technological Risk on EV Adoption Intention. The results of the Technological Risk analysis on the adoption of electric vehicles were rejected (β = -0.031; t = 0.368; p = 0.357) because they were not significant. The rejection of the hypothesis occurred because the items that measure technology concerns were indeed recognized by respondents (TR1) battery life and (TR3) long-term performance having an average of 4.00 in the agree category. The consensus on this risk is reinforced by a low standard deviation (SD) of 0.84-0.87), proving that respondents possess a unified awareness of the inherent risks of the technology (Syahputro & Abdul Hadi, 2024). However, the level of technological worry fails to be a *deterrent* because the intention of adoption is at a relatively moderate level as shown from (TR) The level of concern has an average of only equivalent to the level of purchase intention (*EVA3) the readiness to pay more* has an average of 3.94 below the average level of concern of the respondents. When adoption intentions are at a moderate threshold, an equivalent level of concern is insufficient to significantly alter the decision-making process. Within the Indonesian urban context, technological risk is perceived as an acceptable background concern rather than a decisive dealbreaker. These findings align with the research of (Krishnan & Koshy, 2021b) which posited that EV adoption necessitates a degree of risk tolerance, suggesting that Indonesian consumers tend to accept technological risks as an inherent part of adopting sustainable innovation (Septian Romas et al., 2022)

H6 Policy Incentives on EV Adoption Intention The results of the analysis of policy incentives for electric vehicle adoption show a positive and significant effect (p = 0.000) (β = 0.505) therefore hypothesis H6 is accepted showing that Policy Incentives are the strongest driver of EV adoption in Indonesia. These findings are fully supported by respondents' answers who have a strong consensus (low SD 0.81-0.87) from respondents regarding the importance of incentives with key items such as (PI2) Purchase subsidy Mean 3.85 and (PI1) Tax incentive) Mean 3.88 are in the category of agreeing confirming that fiscal assistance is highly expected. The dominant influence of these policy incentives aligns with the empirical evidence provided by (Hasudungan et al., 2024) who identified that economic incentives are the most critical factor in accelerating the EV transition within Indonesian metropolitan areas. This result implies that Indonesian consumers exhibit high sensitivity toward direct fiscal support, which serves as the most effective tool for financial risk mitigation to encourage adoption intentions (Syahputro & Abdul Hadi, 2024). Consequently, the strong impact of Policy Incentives underscores a pragmatic consumer profile in Indonesia, where structural government intervention that reduces the

initial financial burden outweighs other psychological or altruistic motivations in the decision-making process.

H7a Moderation Policy Incentives on Environmentally Friendly Attitudes. The results of H7a analysis showed a negative influence (β = -0.135) but not statistically significant (p = 0.053). These findings indicate that Policy Incentives fail to strengthen the relationship between Eco-Attitudes and adoption intentions. The failure of Policy Incentives (PI) to moderate this path suggests that financial rewards cannot compensate for a fragile psychological foundation. This aligns with the Motivation Crowding Theory in sustainable behavior which posits that external incentives often fail to amplify weak intrinsic values (Wang & Witlox, 2025). In the Indonesian context, where environmental concern is still categorized as passive awareness (Center for Strategic and International Studies, 2024) fiscal policy is unable to bridge the deep-seated attitude-behavior gap, confirming that subsidies cannot stabilize a motivation that is fundamentally inconsistent (SD = 0.97).

H7b Moderation of Policy Incentives on Economic Benefits. The results of the H7b (*Policy Incentive* -> EB EVA analysis) showed a negative and significant influence (β = -0.155; p= 0.019). Based on the Crowding-Out Motivation Theory prominent extrinsic incentives can inadvertently weaken or crowd out intrinsic rational calculations. When government subsidies (PI) become too dominant consumers shift their focus away from inherent economic benefits like long-term fuel economy (Wang & Witlox, 2025). This finding suggests that in Indonesia, the immediate reward of a subsidy diminishes the consumer's sensitivity to long-term savings, creating a significant negative interaction where the incentive replaces rather than strengthens the economic rationale.

H7c Moderation Policy Incentives on Environmentally Friendly Benefits. The results of the H7c (*Policy Incentive* -> EFB EVA analysis) showed a positive effect (β = 0.134) but not significant (p= 0.075). This failure is rooted in the disconnect found in H3, where respondents value collective air quality (Mean = 4.16) but resist personal financial commitment. Research by (Bryła et al., 2023b) supports that in emerging markets, environmental benefits are frequently overridden by pragmatic considerations. Therefore, even with Policy Incentives, the perception of collective good remains secondary to personal cost, proving that fiscal measures alone are insufficient to transform EVs into a socially-driven purchase in Indonesia (Putri & Gunawan, 2020).

H7d Moderation Policy Incentives on Charging Risk (CR). The results of the H7d (*Policy Incentive* -> CR EVA analysis) were rejected because they were insignificant (β = 0.002; p = 0.489). Unlike the general population, the early adopter segment in Indonesia views infrastructure risk as an inherent challenge of innovation rather than a deterrent (Xie et al., 2022). Because Charging Risk (CR) was found to be a positive driver (β = 0.277), there is no negative barrier for the Policy Incentive to mitigate. This implies that for risk-tolerant urban consumers, the

intention to adopt is driven by technological appeal, making government fiscal support independent of their perception of infrastructure limitations (Hasudungan et al., 2024).

H7e PI Moderation on Technology Risk. The results of the H7e (*Policy Incentive* -> TR EVA analysis) were rejected because they were insignificant (β = 0.047; p= 0.278). Since Technological Risk (TR) was identified only as a "background concern" (Mean = 4.00) rather than a statistically significant barrier, Policy Incentives have no substantial negative influence to weaken. This aligns with (Syahputro & Abdul Hadi, 2024) and (Septian Romas et al., 2022)who noted that as long as the technology is perceived as manageable, consumers do not require additional fiscal protection to mitigate technical fears, prioritizing the innovation's utility instead.

CONCLUSION & SUGGESTION

The results of this study demonstrate that perceived economic advantages and government interventions play a paramount role in shaping consumers' intentions to adopt electric vehicles in Indonesia. This empirical outcome successfully addresses the identified research gap by confirming that pragmatic factors significantly outweigh environmental altruism in the Indonesian market. The findings indicate that while pro-environmental attitudes are widely recognized, they do not directly influence adoption intentions, revealing a pronounced attitude-behavior gap where passive awareness fails to materialize into purchase actions. Furthermore, the unexpected positive influence of charging risk suggests that the current market is composed of risk-tolerant early adopters who are not deterred by infrastructure limitations. Regarding the dual role of policy incentives, it is concluded that direct fiscal support is a substantially stronger driver than its moderating effect. Based on these findings, several recommendations are proposed to enhance EV adoption in Indonesia. First, the government should prioritize the development of reliable and widespread charging infrastructure to reduce long-term consumer concerns. Second, industrial stakeholders are encouraged to improve innovation in battery lifespan and after-sales services to maintain consumer confidence. Lastly, public education campaigns must be redesigned to strengthen environmental values by linking them more directly to personal and economic benefits.

Limitation & Suggestions for Further Research. This study possesses several limitations that should be considered for future inquiries. The use of purposive sampling in specific urban hubs may limit the generalizability of the results to the broader Indonesian population. Therefore, future research is recommended to utilize random sampling techniques and include several regions with different characteristics to provide a more comprehensive national context. Additionally, the theoretical model could be expanded by incorporating external variables such as social norms, family support, or access to capital to develop a more granular and predictive framework for EV adoption intentions in Indonesia.

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