



From Endorsement to Adoption: Examining How Perceived Risk, Perceived Benefits, and Attitude Drive Electric Vehicle Adoption Intention Under Environmental Concern

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Abstract. This study examines how perceived endorsement, range anxiety, perceived benefits, perceived risks, attitude toward electric vehicles (EVs), and environmental concern shape Indonesian consumers' EV adoption and purchase intentions. A quantitative causal survey produced 451 responses, of which 404 usable cases were analyzed using PLS-SEM in SmartPLS 4 with a disjoint two-stage approach for higher-order constructs. Perceived endorsement increased perceived benefits and attitude while reducing range anxiety. Range anxiety increased perceived risk; perceived risk weakened attitude and adoption intention. Attitude increased adoption and purchase intentions, perceived benefits increased purchase intention, and adoption intention increased purchase intention. Environmental concern directly strengthened attitude, adoption intention, and purchase intention and significantly moderated key relationships. The findings show that EV acceptance in Indonesia depends on credible endorsement, tangible benefits, lower perceived risk and range anxiety, and environmental concern translated into practical consumer value. These findings provide important insights into the factors influencing consumer decision-making regarding EVs in Indonesia. The study also highlights the importance of strengthening positive perceptions and reducing psychological barriers associated with EV ownership. By understanding these relationships, policymakers, manufacturers, and other stakeholders can develop more effective strategies to encourage EV adoption and support the transition toward sustainable transportation in Indonesia.

Keywords: Electric Vehicles; Environmental Concern; Perceived Endorsement; Perceived Risk; Purchase Intention.

1. INTRODUCTION

Electric vehicles (EVs) are increasingly positioned as a lower-carbon mobility option, yet their adoption depends on more than technological availability. In Indonesia, market acceptance is still influenced by infrastructure readiness, affordability, policy support, consumer knowledge, and confidence in EV technology (Maghfiroh et al., 2021; Setiawan et al., 2022; Gunawan et al., 2022). Consequently, understanding consumers' evaluations of benefits, risks, and the credibility of the surrounding EV ecosystem is necessary to explain why favorable policy and technological development do not automatically translate into adoption and purchase.

Consumers assess EVs through a benefit-risk trade-off. Perceived benefits include economic, functional, technological, and environmental advantages, whereas perceived risks cover functional, physical, psychological, and financial consequences (Wang et al., 2018; Featherman et al., 2021). Range anxiety adds an EV-specific uncertainty because limited battery range and charging access may intensify broader risk perceptions. Conversely, perceived endorsement—represented by brand trust, government support, and country image—can provide credible external signals that strengthen perceived benefits and favorable attitudes while reducing uncertainty (Zang et al., 2022; Nugraha et al., 2024).

Attitude toward EVs represents an evaluative mechanism connecting these beliefs with behavior. Favorable attitudes are generally associated with stronger adoption and purchase intentions (Febransyah, 2021; Tuan et al., 2022; Bektaş & Akyıldız Alçura, 2024). Environmental concern may further shape this process because environmentally concerned consumers are more likely to regard EVs as consistent with their values and may be more willing to tolerate perceived uncertainty (Solekah et al., 2023; Andrianus, 2023). Therefore, environmental concern can function not only as a direct predictor but also as a boundary condition that changes how benefits, risks, and attitudes are converted into behavioral intentions.

Previous studies have frequently examined risk, technology acceptance, environmental values, or endorsement in separate models. This study integrates perceived endorsement, range anxiety, perceived benefits, multidimensional perceived risk, attitude, environmental concern, EV adoption intention, and EV purchase intention in one framework. Its contribution lies in distinguishing adoption intention from purchase intention and testing environmental concern simultaneously as a direct antecedent and moderator. The objective is to explain how external credibility, perceived advantages, perceived uncertainty, and environmental values jointly move Indonesian consumers from EV evaluation toward adoption and purchase intention.

2. LITERATURE REVIEW

Perceived endorsement reduces information asymmetry by signaling the credibility of the brand, institutional environment, and country associated with an EV. Strong endorsement is expected to decrease range anxiety and improve both attitude and perceived benefits. Range anxiety, in turn, is expected to increase perceived risk because uncertainty about battery sufficiency and charging access can enlarge perceived functional and financial consequences (Zang et al., 2022; Li & Setiowati, 2023).

Perceived benefits should increase purchase intention, whereas perceived risk should weaken consumer evaluation and adoption intention. Attitude is expected to increase both adoption and purchase intentions, while adoption intention should further increase purchase intention as consumers move from accepting the technology to considering a market transaction (Wang et al., 2018; Higuera-Castillo et al., 2021). Environmental concern is expected to strengthen attitude, adoption intention, and purchase intention and to moderate the effects of attitude, perceived risk, and perceived benefits on the relevant outcomes (Solekah et al., 2023; Kottala et al., 2025).

3. RESEARCH METHOD

This study used a quantitative causal design. Primary data were collected through an online questionnaire using purposive sampling among Indonesian consumers who were familiar with EVs and owned or regularly used a car. All measurement items were adapted from established studies and assessed on a five-point Likert scale. Of 451 collected responses, 404 passed data screening. The usable sample consisted of 55.9% women and 44.1% men; 60.1% lived in Jabodetabek, 67.6% owned a car, and 90.8% reported at least a general understanding of EVs.

The model combined reflective lower-order constructs and reflective-reflective higher-order constructs. Perceived Endorsement comprised Brand Trust, Country Image, and Perceived Government Support for EVs, while Perceived Risk comprised Financial, Functional, Physical, and Psychological Risk. PLS-SEM was performed in SmartPLS 4 using the disjoint two-stage approach for higher-order constructs (Sarstedt et al., 2019). Reliability, convergent validity, HTMT discriminant validity, collinearity, R^2 , Q^2 , effect size, and bootstrapped path coefficients were evaluated before testing the direct and moderating effects.

4. RESULTS AND DISCUSSION

The measurement model met the required quality criteria. Across the reported lower-order constructs, outer loadings ranged from 0.760 to 0.885, Cronbach's alpha from 0.716 to 0.870, composite reliability from 0.841 to 0.912, and AVE from 0.638 to 0.767. For the higher-order constructs, loadings ranged from 0.813 to 0.890, alpha from 0.842 to 0.861, composite reliability from 0.894 to 0.915, and AVE from 0.679 to 0.783. All reported HTMT values were below 0.85, with the highest value of 0.835, supporting discriminant validity. Inner VIF values of 1.000–1.703 also indicated no problematic collinearity.

Table 1. Structural Model Assessment and Hypothesis Testing

Hyp.	Structural relationship	β	t	p	f ²	Decision
H1a	AT → EV Purchase Intention	0.295	6.830	<0.001	0.1241	Supported
H1b	AT → EV Adoption Intention	0.298	6.284	<0.001	0.0987	Supported
H2	PB → EV Purchase Intention	0.349	8.349	<0.001	0.2215	Supported
H3a	PR → AT	- 0.337	7.253	<0.001	0.1708	Supported
H3c	PR → EV Adoption Intention	- 0.297	6.239	<0.001	0.1100	Supported
H4	RA → PR	0.707	18.816	<0.001	0.9987	Supported
H5	PE → RA	- 0.614	12.922	<0.001	0.6037	Supported
H6	PE → AT	0.410	9.015	<0.001	0.2593	Supported
H7	PE → PB	0.679	18.184	<0.001	0.8574	Supported
H8	EVAI → EV Purchase Intention	0.169	4.040	<0.001	0.0421	Supported
H9a	EC × AT → EV Purchase Intention	0.161	4.717	<0.001	0.0653	Supported

H9b	EC × AT → EV Adoption Intention	0.355	8.670	<0.001	0.2967	Supported
H9c	EC × PR → AT	0.348	8.992	<0.001	0.2339	Supported
H9d	EC × PB → EV Purchase Intention	0.238	5.463	<0.001	0.0996	Supported
H10	EC → AT	0.320	8.809	<0.001	0.2356	Supported
H11	EC → EV Adoption Intention	0.387	9.007	<0.001	0.2220	Supported
H12	EC → EV Purchase Intention	0.229	4.909	<0.001	0.0846	Supported

The structural results show that positive evaluation and perceived value are central drivers of EV intention. Attitude increased purchase intention ($\beta = 0.295$) and adoption intention ($\beta = 0.298$), perceived benefits increased purchase intention ($\beta = 0.349$), and adoption intention increased purchase intention ($\beta = 0.169$). These results are consistent with studies showing that favorable attitudes and perceived advantages encourage consumers to progress from general acceptance toward a more concrete purchase decision (Febransyah, 2021; Tuan et al., 2022).

The inhibiting mechanism is driven by range anxiety and perceived risk. Range anxiety strongly increased perceived risk ($\beta = 0.707$), while perceived risk reduced attitude ($\beta = -0.337$) and adoption intention ($\beta = -0.297$). Perceived endorsement worked in the opposite direction by lowering range anxiety ($\beta = -0.614$), strengthening attitude ($\beta = 0.410$), and increasing perceived benefits ($\beta = 0.679$). This supports the view that brand trust, government support, and country image serve as credibility signals that can reduce uncertainty surrounding a relatively unfamiliar technology (Zang et al., 2022; Nugraha et al., 2024).

Environmental concern had significant direct effects on attitude ($\beta = 0.320$), adoption intention ($\beta = 0.387$), and purchase intention ($\beta = 0.229$). It also strengthened the effects of attitude on purchase and adoption intentions, perceived benefits on purchase intention, and the relationship between perceived risk and attitude. Because the direct effect of perceived risk on attitude is negative while the EC × PR interaction is positive, stronger environmental concern attenuates the adverse influence of perceived risk on attitude. Thus, environmental motivation can partially compensate for uncertainty, while also helping consumers translate favorable attitudes and perceived benefits into stronger behavioral intentions.

Table 2. Explanatory Power and Predictive Relevance

Endogenous construct	R ²	Q ²
Attitude toward Electric Vehicles	0.568	0.456
EV Adoption Intention	0.435	0.276
EV Purchase Intention	0.587	0.402
Perceived Benefits	0.462	0.458
Perceived Risk	0.500	0.307
Range Anxiety	0.376	0.372

The model explained 58.7% of EV purchase intention and 43.5% of EV adoption intention, while all reported Q^2 values were positive. The findings therefore indicate meaningful explanatory and predictive relevance. Managerially, the original IPMA results place perceived endorsement as the most important factor for purchase intention (0.451), followed by environmental concern (0.404), perceived benefits (0.349), and attitude (0.345). Because perceived endorsement had a performance score of 73.664, below attitude at 82.493, strengthening market credibility remains a clear improvement priority. Price (40.6%), battery range (33.2%), and charging availability (29.7%) were also more frequently cited than environmental impact (20.0%), indicating that environmental positioning should be combined with economic and functional value.

5. CONCLUSION AND RECOMMENDATIONS

This study shows that Indonesian consumers' EV intentions are shaped by an interconnected process of endorsement, benefit evaluation, risk, attitude, and environmental concern. Perceived endorsement strengthens perceived benefits and attitude and reduces range anxiety; range anxiety increases perceived risk; perceived risk weakens attitude and adoption intention; and favorable attitudes and benefits strengthen behavioral intentions. Environmental concern functions both as a direct driver and as a moderator, indicating that environmental values can reinforce positive evaluations and partially offset perceived uncertainty. The distinction between adoption intention and purchase intention further shows that willingness to accept EV technology is an important step toward a concrete purchasing decision.

For EV sellers and policymakers, the findings imply that credibility and practical value should be emphasized together. Transparent battery warranties, reliable after-sales service, clear incentives, realistic range information, charging support, and total-cost-of-ownership communication can reduce risk and range anxiety while strengthening endorsement. The study is limited by purposive sampling, respondent concentration in Jabodetabek, and cross-sectional self-reported intentions. Future studies should use multi-region or probability samples, compare EV users and non-users, and examine actual adoption behavior, charging access, income, and prior EV experience over time.

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