

# Customer Perception of AI Adoption in Electric Vehicles

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## Abstract

*This study investigates the customer perception of Artificial Intelligence adoption in Electric Vehicles (EVs), mainly focusing on trust, attitude, perceived usefulness, and perceived risk associated with AI enabled features such as autonomous driving, AI assistants and predictive services in EVs. The transition of EVs face challenges related to consumer awareness, technology acceptance and trust, and perceived benefits which can influence purchasing decisions and overall adoption. (Mustaphi & Srivastava, 2025; Zhou et al., 2024). Drawing on the Technology Acceptance Model (TAM) and Diffusion Innovation Theory. This study examined data from a sample of 400 Ev owners and potential buyers, collected through survey. Data analysis include descriptive statistics, reliability analysis (Cronbach  $\alpha$ ), factor analysis and structural equation modelling to validate the relationship among constructs. Results shows that high perceived usefulness and trust in AI features improves adoption ( $\beta = .62, p < .001$ ) while perceived risk negatively impact AI acceptance ( $\beta = -.38, p < .01$ ). Additionally education and tech exposure moderated these factors. The study helps in understanding how AI integration within EV influences consumer perception. Findings are valuable for EV marketers, policymakers aiming to accelerate EV adoption through AI driven innovations.*

*Keywords: Electric Vehicles (EVs), Artificial Intelligence (AI). Customer Perception, Technology Acceptance, Consumer Trust.*

## Introduction

EVs represent a transformative shift in sustainable transportation. While environmental benefits and cost savings are pivotal drivers of EV adoption, the integration of AI technologies such as Autonomous driving systems, intelligent assistants, and data driven predictive services is becoming a major influence on consumer choices.( Mustaphi & Srivastava, 2025; Dhankhar et al., 2025). AI applications can enhance safety, convenience, personalisation and energy efficiency, yet they also raise concerns regarding trust, data

privacy and user control. (Khajuria & Singh, 2025) This study explores how consumers perceive AI adoption in EVs and what factors shape these perceptions. By examining the constraints such as perceived usefulness, ease of use, trust, risk, adoption intention, this study aims to provide insights critical for EV manufacturers and decision makers.

## Literature Review

Perception studies play a vital role in the adoption of technology. Classic studies identify environmental awareness, the cost of the vehicle, charging facilities, range anxiety, and social factors as important considerations that influence the adoption of EVs (Khajuria & Singh, 2025; Mustaphi & Srivastava, 2025; Vashisth & Gupta, 2025). Technology acceptance theory identifies that perceptions of usefulness and ease of use are strong predictors of adoption intentions (Davis, 1989; applied to EV adoption by Jyothika et al., 2025). The integration of AI technology into EVs brings in new considerations, such as trust in automation, safety perceptions of AI technology, and data privacy issues. Similar considerations in AI-enabled mobility (e-scooters) identify trust and safety as important predictors of adoption (Kumar et al., 2025). Research on AI adoption also identifies that perceived risk can negatively impact consumer acceptance, even if the benefits are well-recognized (Zhou et al., 2024). Additionally, innovation diffusion theory shows that early adopters consider technological superiority, compatibility, and observability when forming perceptions of new technology (Rogers, 2003). Despite the advances in technology, there is a research gap in studies that empirically relate AI technology characteristics in EVs to customer perceptions and purchasing intentions, which this study proposes to fill.

## Theoretical Framework

This study is based on two theories that complement each other:

### 1. Technology Acceptance Model (TAM)

TAM proposes that Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) are antecedents of an individual's Behavioral Intention (BI) to use technology (Davis, 1989).

In the context of EVs:

- PU for AI: The degree to which consumers value AI-related functionalities (such as autonomous driving and intelligent assistants) that improve the driving experience and safety.
- PEOU: The ease and simplicity of using AI systems.

## 2. Trust and Perceived Risk Framework

Trust in AI, encompassing trust in the reliability, safety, transparency, and data security of the system, has been identified as a key factor in the adoption of technology (Gefen et al., 2003). Perceived risk, encompassing risks of failure, loss of privacy, and loss of control, is hypothesized to have a negative impact on adoption (Bansal & Gefen, 2010).

### Hypothesized Model

Based on these frameworks, nine constructs are considered;

1. PU — Perceived Usefulness
2. PEOU — Perceived Ease of Use
3. Trust in AI
4. Perceived Risk
5. Attitude
6. Behavioural Intention
7. Social Influence
8. Tech Familiarity (moderator)
9. Purchase Intention

The model hypothesizes;

- H1: PU positively affects Attitude and Behavioural Intention
- H2: PEOU positively affects PU
- H3: Trust positively influences Attitude and Behavioural Intention
- H4: Perceived Risk negatively affects Attitude and Behavioural Intention
- H5: Attitude mediates between PU, trust and Behavioural Intention
- H6: Social influence moderates the effect of attitude on Behavioural Intention

This helps in studying the relationship between perceptions of AI and EV adoption intentions.

## Methodology and Data Analysis

Data Collection: Structured Questionnaire was distributed to 400 respondents, items measured on 5 point Likert Scale.

Statistical Analysis: SPSS software used for analysis. Tests used were Cronbach's  $\alpha$ , Exploratory Factor Analysis (EFA), Confirmatory Factor Analysis (CFA), and Structural Equation Modelling (SEM).

## Descriptive Statistics

Variable	Mean	SD
Perceived Usefulness	4.12	0.68
Ease of Use	3.98	0.72
Trust in AI	3.75	0.81
Perceived Risk	2.84	0.92
Adoption Intention	3.89	0.69

## Reliability

Construct	Cronbach's $\alpha$
PU	.88
PEOU	.85
Trust	.82
Perceived Risk	.79
Adoption Intention	.90

## Structural Model Results

Hypothesis	$\beta$	p-value	Supported?
H1 (PU $\rightarrow$ BI)	.62	<.001	Yes
H2 (PEOU $\rightarrow$ PU)	.55	<.001	Yes

Hypothesis	$\beta$	p-value	Supported?
H3 (Trust $\rightarrow$ BI)	.46	<.01	Yes
H4 (Risk $\rightarrow$ BI)	-.38	<.01	Yes
H5 (Attitude mediates)	.48	<.001	Yes

## Findings and Suggestions

### Findings

- 1) Perceived usefulness of AI features is a strong predictor of EV adoption intention.
- 2) Ease of use indirectly affects adoption by increasing perceived usefulness.
- 3) Trust in AI is a significant factor that increases positive attitudes and adoption intentions.
- 4) Perceived risk, including privacy and safety risks, is a significant factor that decreases adoption interest.
- 5) Social influence and tech familiarity moderate the relationship between perception and actual purchase intention.

### Suggestions

- 1) Enhance customer education regarding the benefits and safety aspects of AI.
- 2) Improve the ease of use of interfaces.
- 3) Enhance transparency in AI systems.
- 4) Proactively address privacy and safety issues through certifications.
- 5) Leverage peer testimonials and influencer marketing to enhance social influence.

### Conclusion

This research proves that the adoption of AI in EVs is a multi-dimensional phenomenon, as perceived usefulness, ease of use, trust, and perceived risk are key factors that affect the adoption of AI in EVs. Even though AI technology has the potential to significantly enhance the attractiveness of EVs, issues of reliability and data privacy are still

major hurdles. The automobile industry needs to pay attention to effective communication and trust-building strategies to hasten the adoption process.

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