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Determinants of Green Mobility Transition: Investigating Public Perception, Awareness, and Electric Vehicle Adoption Intentions for Environmental Mitigation in India.

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Abstract

The transport sector is responsible for approximately one quarter of greenhouse gas emissions. Electric vehicles (EVs) have emerged as a pivotal component of the global transition toward green mobility. Despite growth, the Indian electric vehicle market continues to experience sluggish adoption, mainly due to limited public awareness and uncertainty regarding perception of EV. This study investigates how public environmental awareness and perception of EV influence the purchase intentions of electric vehicles for environmental mitigation in India, with a particular emphasis on 2- and 4-wheelers. Utilizing a cross-sectional survey of 175 respondents from various major cities of India, the study employed descriptive statistics, reliability assessment, correlation, and multiple-regression to evaluate the proposed relationships. All measurement scales demonstrated excellent internal consistency, and correlation results indicated strong positive associations among public awareness, perception of EV, and purchase intention. Regression findings revealed that both predictors significantly influence purchase intention, explaining 71% of its variance, with perception of EV emerging as the strongest determinant. These results suggest that while awareness of environmental mitigation benefits contributes meaningfully to favourable attitudes, consumers' adoption decisions are more strongly shaped by evaluations of economic utility, performance expectations, and perceived benefits relative to risks. The study advances current understanding by empirically demonstrating the combined behavioural influence of awareness and perception of EV within the Indian context, addressing a notable gap in existing literature. The findings underscore the need for policy and industry interventions that enhance consumer awareness, reduce informational barriers, and emphasise tangible value propositions to accelerate the transition toward green mobility transition in India.

Keywords: *Green mobility transition, Public perception, Environmental pollution mitigation, Adoption intention, India*

Introduction:

In recent years, many countries and international institutions have considered climate change and greenhouse gas emissions as a hazardous problem for human health. Conventional vehicles (i.e., petrol/diesel fuel-fired) operate on energy generated through combustion of fossil fuels, and this combustion results in increased environmental pollution, such as polluted air and CO2 emissions. Using conventional vehicles increases dependence on fossil fuels and energy depletion (Jiang et al., 2024). To reduce the impact of conventional vehicles on environmental pollution, alternatives are being adopted, and Electric vehicles (EVs) are one of them. Electric vehicles (EVs) are an electrified transport with on-board batteries that can be recharged from an electric outlet. It can also diminish CO2 emissions substantially, as electricity is generated from green energy sources (Dutta et al., 2021). It is one of the green products for sustainable personal transportation that can offset environmental pollution and improve sustainable mobility. Electric vehicles offer significant benefits in reducing environmental pollution compared to conventional internal combustion engine vehicles. The principal environmental advantage of EVs lies in their zero tailpipe emissions, which directly halt air pollution from vehicle exhaust. EVs contribute to a substantial decrease in air pollution and greenhouse gas emissions when integrated with renewable energy sources. The environmental benefits of EVs largely depend on the energy sources used for charging or electricity generation. If electricity is generated through renewable energy sources such as solar, wind, or geothermal energy, then it will benefit by reducing reliance on fossil fuels and lowering the carbon footprint of vehicle operation. Electrification of personal transportation vehicles can lead to large public health benefits by reducing exposure to fine particulate matter and other harmful pollutants. Studies in countries like the Philippines and China demonstrate that EV adoption leads to a significant decrease in air pollution and greenhouse gas emissions by reducing dependency on imported fossil fuels and shifting towards a cleaner transportation system. These benefits are enhanced with electric grid transitions towards renewable energy. For instance, the broader penetration of EVs in China, particularly when combined with cleaner power generation, provides considerable air quality, health, and climate change mitigation benefits (Agaton et al., 2020; Hsieh et al., 2022). Consumer acceptance is a major prerequisite for the mass adoption of electric vehicles EVs also contribute to lower noise pollution, enhancing the quality of life and promoting social equity by improving public health. The clean air resulting from reduced pollution reduces healthcare costs and addresses social disparities linked to pollution exposure (Rajan et al., 2024). While EVs' environmental benefits are significant, some challenges remain. Air pollution reduction depends on the energy mix, as electricity production for EVs may cause emissions elsewhere if fossil fuels dominate power generation. However, even under a less renewable-intensive grid, EVs offer substantial net pollution reductions compared to ICEVs (Sharma et al., 2023). Environmental awareness is one of the important factors that can influence the adoption of green products (Paul et al., 2016; Kaplan, 1991; Kim et al., 2018), like Electric Vehicles (Wang et al., 2016; Mustafa et al., 2024; Wu et al., 2019; Singh et al., 2020; Wang & Witlox, 2025). The people who are more aware of their environment and are concerned about it are likely to make a purchase of a green or sustainable product (Heffner et al., 2007; Kahn, 2007; Gallagher & Muehlegger, 2011), as this environmental knowledge helps them to understand the need for change. Solely environmental awareness and perception cannot predict consumer intention to purchase an Electric vehicle. Perception of EV also plays a significant role in predicting this behaviour. Perception of EV is the sum of all the benefits and utility a consumer gets after comparing it with its alternatives (Thaler, 1985; Zeithaml, 1988; Monroe, 2002). According to Chen & Chang (2012) and Cortimiglia (2016), perception of EV is an important determinant influencing green product purchase. Thus, it has a major impact on the purchase intention of Electric Vehicles (M.-K. Kim *et al*., 2018).

Indian electric vehicle market landscape: India's transition toward electric mobility has intensified over the past decade, yet EV penetration remains modest despite strong policy support. According to the 2025 NITI Aayog report, national EV sales increased from 50,000 in 2016 to over 2.08 million units in 2024, representing 11% of global EV sales, but India's total EV penetration reached only 7.66%, significantly lower than the global average of 16.48%. Persistent barriers such as inadequate charging infrastructure, low charger utilization, high upfront costs, and fragmented public awareness continue to impede mass adoption. Notably, the NITI Aayog report identifies a widespread lack of adequate awareness regarding EV performance, range, battery safety, and long-term cost savings, alongside misconceptions about Total Cost of Ownership (TCO). These factors indicate that public understanding of EVs is superficial, limiting the translation of environmental concern into adoption behaviour. Given these contextual challenges, examining how environmental awareness, perceived environmental benefits, and perception of EV influence EV adoption becomes critical. Overall, EVs play a critical role in reducing environmental pollution, mitigating climate change, and promoting sustainable personal transportation, especially when paired with renewable energy expansion and supportive infrastructure. Their widespread adoption helps in addressing air quality issues, health impacts, and the global need to reduce greenhouse gas emissions (Naik et al., 2024; Delucchi et al., 2014; Breuer et al., 2021). Although international literature suggests that environmental attitudes and perception of EV strongly shape EV purchase intentions, empirical studies specific to India remain limited and rarely incorporate updated national-level insights. This study addresses this gap by empirically testing environmental awareness, environmental perception, and perception of EV (extended factor) as predictors of EV adoption intention, while examining demographic effects within the contemporary Indian EV landscape.

Literature Review & Research Gap:"IBEF 2025" India's economy continued to grow, surpassing Japan in June 2025 to become the fourth largest in the globe after surpassing the United Kingdom (UK) to become the fifth largest economy in Q1 FY23 and expected to overtake Germany by 2028 with a GDP of Rs. 4,26,45,000 crore (US$5 trillion) by 2027. This economic expansion has risen Energy consumption (Jain and Rankavat, 2023). India's per-capita energy consumption increased from 14,682 megajoules per person in 2014–15 to 18,410 megajoules

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per person in 2023–2024 (Press Information Bureau, 2025). Transportation sector is one of the major sectors when it comes to energy consumption. NITI Aayog reported India is one of the world's biggest producers of automobiles and two-wheelers despite being a developing market and by 2030, it is predicted that the fleet of automobiles will surpass 200 million vehicles on the road, nearly doubling. But this growth comes with a cost at certain times. According to the International Energy Agency's assessment (IEA, 2018), half of all greenhouse gas emissions will come from the transportation sector, with India ranking third in the world for CO2 emissions (Rehman, A. 2025). The sustainable growth of human economies and society is seriously threatened by global climate change brought on by greenhouse gas (GHG) emissions (Qin et al., 2025). To mitigate this problem, India is promoting green energy and has pledged to remove its majority dependency on fossil fuel and strives to achieve zero carbon emission status. New energy vehicles (NEVs) are a promising substitute for conventional vehicles (CV) in the transportation industry and play a key role in lowering transportation-related emissions (Yu et al., 2023). In this Electric vehicles (EVs) are the most popular type of NEV (Qin et al., 2025). Due to their capacity to lower emissions, enhance urban air quality, and separate mobility from fossil fuels, electric vehicles (EVs) have emerged as a key component of the global shift toward low-carbon and sustainable transportation systems, many nations have made EV adoption a top priority (Simwaba & Qutieshat, 2026). But this upsurge is still lacking in developing countries. Just 2% of all cars sold in India in 2024 were electric cars (Global EV forecast, 2024). Long charging times, poor infrastructure for charging, and high upfront expenses works as major hindrances in its adoption (Qin et al., 2025; Simwaba & Qutieshat, 2026). There are several factors that play a considerable role in the adoption of electric vehicles. This study particularly focuses on two predictors that may cause the adoption of electric vehicles, such as public environmental awareness (PA) and perception of EV (PV), on purchase intention (PI) of electric vehicles in India. Prior studies consistently show that environmental awareness and perceived environmental value are major psychological drivers of electric vehicle (EV) adoption, yet their combined predictive influence remains unexplored, particularly in emerging markets. Research across Japan, China, Malaysia, and India demonstrates that higher environmental consciousness significantly strengthens EV purchase intention (Okada et al., 2019; Wu et al., 2021; Honnali et al., 2024), while value-based evaluations such as perceived benefits, performance, cost savings, and risk reduction emerge as the strongest determinants of adoption intention (Dutta & Hwang, 2021; Hu et al., 2023; Xu et al., 2019). However, several studies also emphasize that environmental concern alone is insufficient unless translated into perception of EV and favourable attitudes (Xu et al., 2019; Hu et al., 2025), suggesting the need to assess both constructs concurrently. Additionally, much of the existing evidence predates the rapid growth of the Indian EV ecosystem and does not explicitly test how environmental perceptions and perception of EV operate together to predict adoption intention using high- reliability scales. Therefore, despite strong evidence that both environmental beliefs and perception of EV contribute to EV acceptance, there remains a clear gap in understanding their relative and combined explanatory power within the current Indian context.Relevant literature is reviewed, keeping in mind specifically the environmental concerns and perception of EV and its impact on the purchase or buying decision of electric vehicles listed in Table 1.

Table 1: Relevant literatures

Author/s	Year	Objectives	Key variables	Key findings
Delucchi et al.	2013	Comprehensive assessment of EV technology, infrastructure, emissions, and acceptance.	Technology, infrastructure, emissions, consumer acceptance	EVs have potential lifecycle benefits but require infrastructure and policy support for uptake.
Liu et al.	2015	Impact of environmental consciousness and attitudes to transportation on electric vehicle purchase intentions.	Environmental consciousness, Automobile dependency, Attitudes towards EVs and Attitude toward the future prospects for EVs	Both environmental consciousness and attitudes to transportation significantly impacts EV buying intentions.
Ang et al.	2017	Regression modeling of customers' purchase intention towards green cars in Malaysia.	Price, attitude, perceived usefulness, intention	Regression indicates attitude and perceived usefulness predict intention; contextual influences matter.
Degirmenci & Breitner	2017	Determine whether—green‖ attributes outweigh the price and range in EV purchase intention.	Greenness, price, range, purchase intention	Green attributes significantly influence intention, but price and range remains important — trade-offs depend on the consumer segment
Yong et al.	2017	Identify factors influencing purchase intention toward green vehicles in Malaysia.	Attitude, perception of EV, social influence, intention	Attitude and Percieved Values are strong predictors in an emerging-market context.
Kim et al.	2018	Identifying the relationship between perception of EV and EV adoption and checking the moderating effects of environmental traits on adoption intention.	Perception of EV, Enivornmental innovativeness, Environmental concern and Adoption intention.	Perception of EV determined EV adoption intention. Environmental innovativeness and Environmental concern had a main effect whereas Environmental concern had moderating effects too on adoption intention.
Vidhi & Shrivastava	2018	Review EV lifecycle emissions and policy recommendations to boost EV penetration in India	Lifecycle emissions, policy	Identifies policy levers (subsidies, infrastructure) and lifecycle emissions caveats.
Haider, Zhuang & Ali	2019	Identify and bridge the attitude–behavior gap in sustainable transport adoption.	Attitude–behavior gap, behavioral interventions	Behavior-change interventions are needed to translate positive attitudes into actualadoption.
Khurana, Kumar & Sidhpuria	2019	Study EV adoption in India; attitude as mediator.	Attitude, perceived usefulness, adoption	Attitude mediates other determinants and significantly affects adoption intention.
Okada, Tamaki & Managi	2019	Investigate the effect of environmental awareness on EV purchase intention and satisfaction in Japan.	Environmental awareness, purchase intention, satisfaction	Environmental awareness positively affects intention and post-purchase satisfaction; stronger effects are found among environmentally conscious segments.
Xu, Prybutok & Blankson	2019	Develop an environmental awareness → purchasing-intention model.	Environmental awareness, perception of EV, and intention	Environmental awareness influences intention indirectly through perception of EV and attitudes.
Agaton, Collera & Guno	2020	Socio-economic & environmental analysis of sustainable public transport in the Philippines.	Economic, environmental indicators, and transport sustainability	EV and sustainable transport policies yield socioeconomic and environmental co-benefits when well- planned.
Choma et al.	2020	Assess health impacts of EVs via air pollution changes in the US.	EV adoption, air pollution, health outcomes	EV adoption reduces population exposure to harmful pollutants and yields public health gains.
Schnell et al.	2020	Potential for EV adoption to mitigate extreme air qualityevents in China.	EV adoption, extreme air quality events	EVs can reduce the severity of extreme pollution episodes, contributing to resilience.
Tanwir & Hamzah	2020	Predict purchase intention for hybrid EVs in an emerging economy.	Perceived usefulness, attitude, intention	TPB-related constructs predict intention; perceived usefulness is important.
Xu, Wang, Li & Zhao	2020	Identify determinants of consumers' intentions to adopt EVs.	Environmental concern, perceived usefulness, social norms, and intention	Environmental concern and perceived usefulness are significant predictors; social norms mediate effects.
Yang, Tu & Jiang	2020	Examine influential factors of consumers' sustainable consumption with the EV case in China.	Environmental consciousness, perception of EV, and intention	Environmental consciousness and perception of EV positively affect sustainable purchase behaviors.
Breuer et al.	2021	Evaluate how bevs, fcevs, and catenary trucks reduce GHG and pollution for light/heavy vehicles.	Vehicle technology, emissions reduction potential	Battery and fuel-cell solutions offer considerable emissions reductions depending on the application.

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Cheikh-Mohamad et al.	2021	Assess PV-powered EV charging station requirements & feasibility.	PV charging feasibility, infrastructure variables	PV-powered charging is feasible under specific conditions; implications for green charging infrastructure.
Dutta & Hwang	2021	Examine determinants of consumer purchase intentions for green EVs, integrating technological and environmental considerations.	Technological considerations, environmental considerations, and purchase intention	Both technological (performance, range, charging) and environmental considerations positively influence purchase intentions; integrated models explain substantial variance.
Hu, Javaid & Creutzig	2021	Identify leverage points to accelerate shared electric car adoption (perceived benefits & environmental impact).	Perceived benefits, environmental impact, and adoption	Perceived benefits (convenience, cost savings) and clear environmental impact evidence are key levers.
Wu et al.	2021	Explore links between materialism, ecological consciousness, and EV purchasing intention in China.	Materialism, ecological consciousness, and purchase intention	Ecological consciousness increases intention; materialism moderates the effect (reduces green motivation).
Ali & Naushad	2022	Investigate motivators for EV adoption.	Consumer motivators, purchase intention	Financial incentives, awareness, and perceived benefits areimportant motivators.
Hsieh et al.	2022	Integrated assessment of emissions, air quality & health from China's EV transition.	Emissions, air quality, health impacts	Transition to EVs reduces emissions and improves public health, depending on power-sector decarbonization.
Joshi, Malhotra & Singh	2022	Assess the adoption intention of EVs in India and the mediating role of governmentpolicies.	Government policies, attitude, and adoption intention	Policy incentives mediate attitude–intention relationships; supportive policies aredecisive.
Hu, Zhou, Wang, Gao & Zhu	2023	Analyze consumers' value perception and purchase intention via benefit–risk analysis.	Perceived benefits, perceived risks, purchase intention	Perception of EV (benefits > risks) drives intention; risk perceptions reduce adoption likelihood.
Klabi & Binzafrah	2023	Analyzing factors influencing attitudes and behaviors toward electric vehicle in Saudi Arabia.	Environmental concern (EC), Self-transcendence (ST), Islamic values (IsV) Conservation (Cv), and Electric vehicle purchase intention (EVPI)	(IsV), (Cv) do not impacts (EC) or (EVPI). Although (ST) has significant impact on EVPI. EC mediation is supported in this relationship.
Sharma et al.	2023	Systematic review: equity implications of EVs (spatial emissions & health).	Spatial distribution, equity, and health impacts	EV benefits are spatially heterogeneous; equity-sensitive policies required.
Sukma et al.	2023	Using the extended theory of planned behavior to analyze how government policies and environmental concerns affect Indonesian consumers' intentions to buy electric car.	Environment awareness (EA), Government Policy (GP), Attitude (AT), Subjective norm (SN), Perceived behavioral control (PCB) and Purchase intention (PI).	(AT), (PCB), (EA), and (GP) exhibit neutral perceptions of the (SN) and good perceptions of the (PI). The intention to purchase an electric vehicle is positively and significantly impacted by (EA) and (GP).
Wang & Tian	2023	Assess how new energy vehicle attributes affect consumer purchase intention under SDG framing.	Product attributes (range, price, tech), purchase intention	Product attributes linked to sustainability goals positively influence intention; perceived contribution to SDGs strengthens the effect.
Hasan et al.	2024	Analyzing intention to purchase electric vehicles in India by incorporating price value and environmental concern.	Environmental Concern, Price value, Subjective norm, Perceived Behavioral Control, Consumer Attitude, and Purchase intention	The perception of electric vehicles is positively impacted by price value and environmental concerns. Additionally, it demonstrates the beneficial effects of attitude, perceived behavioral control, and subjective norms on the intention to buy electric vehicles.
Honnali et al.	2024	Analyze the influence of environmental consciousness on EV purchase intentions.	Environmental consciousness, purchase intention	Environmental consciousness positively predicts purchase intention; policy implications are discussed.
Jiang et al.	2024	Review energy storage technology for pure EVs (technology & application).	Battery technology, storage solutions	Identifies technical bottlenecks and advancements shaping EV performance and adoption economics.
Mustafa et al.	2024	Examining the intention of consumers to adopt electric vehicles (EVs) by using self-identification expressiveness (SIE) and environmental awareness (EA) as new variables in the value-based technology adoption model.	Perceived usefulness, Self-identification expressiveness, Technicality, Cost, value, Environmental awareness, Perception of EV and Adoption intention.	Environmental awareness and perception of EV has significant impact on the EV adoption intentions. PV also works as a mediator in the model.
Naik et al.	2024	Comprehensive review of EVs (technology, policy, adoption).	Lifecycle, policy, adoption barriers	Synthesizes barriers and policy levers to improve adoption, with emphasis on India-specific challenges.
Rajan et al.	2024	Study the environmental & social impacts of EVs.	Environmental impacts, social outcomes	Mixed impacts: lifecycle benefits depend on manufacturing & energy mix; social implications include equity concerns.
Hendharta & Soesilo	2025	Analyzing the impact of Environmental Concerns and Online Reviews on Electric Vehicle Purchase Intention in Jakarta.	Environmental Concerns, Online Reviews and Purchase Intention	The intention to purchase an electric vehicle is positively and significantly impacted by both environmental concerns and online reviews.
Hu, Yusof & Mansor	2025	Apply TPB to NEV purchase intentions, focusing on perceived value (China).	Attitude, subjective norm, perceived Behavioural control, perceived value, intention	Perception of EV mediates TPB constructs; strong explanatory power for intention
Jia et al.	2025	Seeks to determine how EV adoption intention is impacted by EV perception.	Environmental benefits, Instrumental attributes, and Incentive policies and Adoption intention.	The adoption intention is greatly influenced by the perception of EV environmental benefits, which also completely mediates the effects of environmental concern on EV adoption intention.
Kottala et al.	2025	Finding and quantifying the most critical factors that lead to the intention to purchase electric vehicles (EVs)	Perception of EV (PV), digital innovation, Environmental concern (EC), Environmental knowledge (EK), Digital innovation (DI), Social influence (SI), Sustainability perceptions (SP), Technology trust (TT), and Purchase intention (PI).	(PV) was found to be a predictor of EV (PI), and (EC) has a positive effect on (SP), confirming that perceptions of EVs' environmental contributions are directly influenced by ecological awareness.
Rehman, A.	2025	Examining how Indian consumers' subjective norms, attitudes, and electric vehicle purchase intentions (EVPI) are affected by environmental concern (EC) and environmental knowledge (EK).	Environmental concern, Environmental knowledge, Price sensitivity, Subjective norm, Attitude towards electric vehicle and Electric vehicle purchase intention.	Subjective norms and attitudes about electric vehicles are positively and significantly influenced by EC and EK. EVPI is heavily influenced by subjective norms and attitudes.

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Research Objectives

- To assess the influence of public environmental awareness (PA) on EV purchase intention (PI).
- To examine the role of perception of EV (PV) on EV purchase intention (PI).

Hypothesis development

The hypotheses of the study are as follows:

H_1: Public environmental awareness (PA) has a significant positive impact on electric vehicle purchase intention (PI).(Wang et al., 2016; Mustafa et al., 2024; Wu et al., 2019; Singh et al., 2020; Wang & Witlox, 2025)

H_2: Perception of EV (PV) has a significant positive impact on electric vehicle purchase intention (PI). (Zhang et al., 2022; Loudiyi et al., 2022; Vishwakarma, 2024; Kim *et al*., 2018)

Methodology

A quantitative, cross-sectional research design was employed to empirically test the proposed relationships. Data were collected through primary and secondary sources. Primary data was collected from 175 respondents through a structured online questionnaire targeting current and potential EV users in urban and semi-urban, and rural regions of India. Secondary data was collected from various literature and reports. Descriptive statistics, Reliability and validity tests, Pearson correlation, and multiple regression analysis techniques were used to analyse the data collected through the questionnaire. For reliability analysis, Cronbach's alpha is applied.

Short description of constructs:

Public Awareness (PA): General awareness and knowledge of environmental pollution mitigating benefits related to EV adoption.

Perception of EVs (PV): Overall evaluation of EVs' benefits relative to perceived costs or risks. Purchase Intention (PI): Individual's expressed willingness or likelihood of purchasing or adopting an electric vehicle.

Data Analysis and Interpretation

1. Descriptive Insights

Table 2: Descriptive analysis of responses collected through the survey using frequency percentage.

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	97	55.4
	Female	78	44.6
Age (Years)	21–30	110	62.9
	31–40	52	29.7
	41–50	12	6.9
	Above 50	1	0.6
Education	Postgraduate	83	47.4
	Undergraduate	53	30.3
	PhD	32	18.3
	Diploma	2	1.1
	Higher Secondary	4	2.3
	Others	1	0.6
Occupation	Private Employee	70	40.0
	Student	70	40.0
	Govt. Employee	7	4.0
	Entrepreneur	13	7.4
	Home-maker	7	4.0
	Unemployed	8	4.6
Monthly Family Income (INR)	Below 25,000	37	21.1
	25,001 – 50,000	32	18.3
	50,001 – 1,00,000	25	14.3
	1,00,001 – 2,00,000	28	16.0
	2,00,001 – 4,00,000	15	8.6
	Above 4,00,000	38	21.7
Place of Residence	Urban	130	74.3
	Semi-Urban	30	17.1
	Rural	15	8.6
Household Vehicle Ownership	No Vehicle	14	8.0
	1–2 Vehicles	109	62.3
	3 or More Vehicles	30	17.1
EV Owner	Yes	13	7.4
EV Purchase Intention	Yes	73	41.7
	No	47	26.9
	Undecided	42	24.0

The demographic profile shows a balanced gender distribution (55.4% male, 44.6% female) and a predominantly young sample, with 62.9% aged 21–30. Respondents were highly educated, as 47.4% held postgraduate degrees and 30.3% had undergraduate qualifications. Private employees and students each constituted 40% of the sample. Income levels varied, with the largest groups earning below ₹25,000 (21.1%) and

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above ₹4,00,000 (21.7%). Most participants resided in urban areas (74.3%), and 62.3% owned 1–2 vehicles. Only 7.4% currently owned an EV, though 41.7% indicated future purchase intention, highlighting strong potential for increased EV adoption.

Table 3: Reliability analysis

Scale Reliability Statistics	
Scale	**Cronbach's α**
PA	**0.972**
PV	**0.942**
PI	**0.978**

For analysing the reliability of scales developed, we have used Cronbach's alpha. Based on the table presented above, all three variables are reliable. The reliability analysis demonstrates excellent internal consistency across all measurement scales used in the study. The Public Awareness (PA) scale recorded a Cronbach's alpha of 0.972, indicating exceptionally high reliability and suggesting that all items measuring awareness of EV-related environmental benefits are highly consistent. The Perception of EV (PV) scale produced a Cronbach's alpha of 0.942, reflecting very strong internal reliability and confirming that the items effectively capture respondents' evaluations of perceived environmental value based on the Benefits and risks associated with EVs. Similarly, the Purchase Intention (PI) scale achieved a Cronbach's alpha of 0.978, demonstrating outstanding reliability and indicating that the scale items consistently measure individuals' willingness or likelihood to adopt EVs. Overall, all three scales exceed the commonly accepted threshold of 0.70 for social science research and confirm that the constructs used in the study are measured with excellent reliability, supporting the robustness and validity of subsequent statistical analyses.

Correlation Analysis

A Pearson correlation analysis was conducted to examine the bivariate relationships among Public Awareness (PA), Perception of EV (PV), and Purchase Intention (PI). The results from the dataset results are presented below.

Table 4: Correlation analysis

Variables	PA	PV	PI	P-Value
Public Awareness (PA)	1	-	**0.765**	**< .001**
Perception of EV (PV)	-	1	**0.830**	**< .001**
Purchase Intention (PI)	**0.765**	**0.830**	1	**< .001**

The correlation analysis shows strong and statistically significant positive relationships among all variables. Public Awareness (PA) shows a strong correlation with Purchase Intention ($r = 0.765$, $p < .001$), indicating that individuals with higher awareness of EV-related environmental pollution reduction benefits are more inclined to consider purchasing an electric vehicle. Perception of EV (PV) also demonstrates a very strong association with Purchase Intention ($r = 0.830$, $p < .001$), suggesting that higher perception of EV of benefits of EVs significantly enhances consumer willingness to adopt EVs. The strength of these correlations aligns with prior literature emphasizing the importance of awareness and perception of EV as foundational precursors to green technology adoption.The partial correlation analysis further indicates that PA and PV remain significantly associated ($r = 0.521$, $p < .001$) even when controlling for PI, demonstrating that both constructs share meaningful variance and contribute distinctly to consumer evaluations.

Regression Analysis: A multiple linear regression analysis was conducted to assess the predictive impact of Public Awareness (PA) and Perception of EV (PV) on Purchase Intention (PI).

Table 5: Model fit measures

Metric	R	R2	Adjusted R^2	P-Value
Value	0.843	.710	.706	<.001

Table 6: Model coefficient

Predictor	Estimate	SE	T Value	P Value
Intercept	0.340	0.1817	1.87	0.063
PA	0.234	0.0716	3.26	0.001
PV	0.653	0.0820	7.96	<.001

Table 7: Collinearity statistics

	VIF	Tolerance
PA	3.09	0.324
PV	3.09	0.324

Table 8: Normality test using the Shapiro-Wilk

Normality Test (Shapiro-Wilk)	
Statistic	**P**
0.961	**< .001**

The regression model explains 71.0% ($R^2 = 0.710$) of the variance in Purchase Intention, indicating a robust predictive framework. Both Public Awareness (PA) and Perception of EV (PV) emerge as statistically significant predictors. Public Awareness (PA) has a significant positive influence on Purchase Intention ($\beta = 0.234$, $p = .001$), confirming that increased awareness of EV benefits, particularly environmental benefits, enhances consumer willingness to adopt EVs. Perception of EV (PV) demonstrates a much stronger predictive effect ($\beta = 0.653$, $p < .001$), suggesting that perceived cost savings, performance benefits, and overall utility play a dominant role in shaping adoption decisions. The higher standardized coefficient for PV indicates that perception of EV is the most influential driver in the model, consistent with prior research emphasizing that economic and functional evaluations of EVs outweigh environmental motivations alone. The study shows an acceptance value of 3.09 (both predictors) in the Multi-Collinearity diagnostics. The normality test (Shapiro–Wilk = 0.961, $p < .001$) indicates that linear regression assumptions remain sufficiently met for interpretation

Discussion and Conclusion

By leveraging the existing market insights and empirical approach, the present study explored the role of Public Awareness (PA), Perception of EV (PV) on Purchase Intention (PI) of Electric Vehicle (EV) in India. In accordance with the previous research on sustainable consumption and technology adoption, two hypotheses were developed and received empirical support in both. The purchase intention of the consumers is significantly and positively influenced by both public awareness and perception of EV, but perception of EV was found to be the most significant predictor of purchase intention; but the predominance of perception of EV suggests that actual and personally relevant benefits, such as cost effectiveness, functional performance, driving range and long term savings, are more important to Indian consumers than mere

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public awareness of environmental concern. Although purchasing behavior is not always a direct outcome of pro-environmental views, which are highly driven by environmental understanding. This is an example of a behavioral-economic trend that shows consumers prioritize short-term and tangible utility over abstract social benefits, particularly in price-sensitive and risk-averse markets. Further compounding the direct behavioral impact of awareness-based appeals is the tendency of many customers to place the burden of environmental conservation on the government and not on themselves. The results also suggest that there is a gap between assurance and trust. Uncertainties over the reliability of batteries, resale value, after-sales service and charging infrastructure are barriers to turning awareness into intention, even among environmentally conscious consumers. Perception of EV has a much more significant role as a predictive in this case because it incorporates the combination of risk minimization and economic rationale. The study explained 71% of the variation in the purchase intention This results in a possible strong explanatory framework and underscores the importance of PA and PV on understanding the behaviour of EV adoption in the Indian context. These findings are consistent with policy-level analyses examined and released at the national level, including the NITI Aayog EV Opportunity Report, which flags battery durability, reduction in lifetime costs, simplicity of charging, and low public awareness of EV performance as key hurdles to large-scale adoption. The external validity of the study can be bolstered by agreement of empirical findings with the policy-level observations. Practically speaking, industry stakeholders need to develop more lucid and evidence-based communications efforts that promote the understanding of total cost of ownership, long-term fuel savings, maintenance benefits, and performance reliability because of the heavy weights in the predictive force of perception of EV. At the same time the preconceptions of consumers on issues of safety, range anxiety, infrastructural sufficiency and battery lifespan must be overcome by awareness-building campaigns that go beyond general environmental message. To make the abstract awareness tangible in terms of value-perceptions, policymakers and manufacturers can recourse to experiential interventions such as shared mobility platforms, public transportation with electric vehicles and test-drive programmes. Practically speaking, since perception of EV has a big predictive impact, there is a need among industry stakeholders to evolve better ways of communicating using evidence and talk about total cost of ownership, long-term fuel savings and maintenance benefits and performance reliability, etc. Overall, the study suggests that the perceived alignment between institutional support and individual utility plays a greater role in restricting India's EV transition than just ignorance. In order to expedite the adoption process of electric vehicles and to further India's transition to sustainable and ecologically responsible mobility systems, it will be important to bridge this gap through value-centric communication, institutional trust building, and infrastructural assurance.

Theoretical Contribution and Implication for Practice

- Overall, the study contributes to EV adoption literature by demonstrating the combined influence and relative strength of awareness and perception of EV within the rapidly evolving Indian context.
- The strong predictive role of perception of EV in this study reinforces the need for industry stakeholders to design clearer, evidence-based communication strategies that articulate the real economic advantages of EVs.
- Simultaneously, awareness-building initiatives must be strengthened to correct misconceptions about safety, range anxiety, and infrastructure adequacy.
- The insights generated here can support policymakers, manufacturers, and mobility service providers in designing targeted interventions—ranging from educational campaigns to value-centric marketing strategies—that can accelerate India's transition toward sustainable and environmentally responsible mobility systems.

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