

DRIVING SUSTAINABILITY: UNVEILING THE PREDICTIVE POWER ON ATTITUDES AND PURCHASE INTENTIONS TOWARDS ELECTRIC VEHICLES IN DELHI NCR

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ABSTRACT

The increasing global concern over environmental sustainability and the need to reduce greenhouse gas emissions has driven the rapid development and adoption of electric vehicles (E-Vehicles) worldwide. India, in particular, has seen a surge in the interest and production of E-Vehicles in recent years, with Delhi -NCR being one of the major metropolitan regions witnessing this transformation. This thesis aims to investigate the Perception and Attitude of Consumers towards E-Vehicles in NCR, with a focus on understanding consumer awareness, attitudes, and the impact of various factors influencing their perception and purchasing intentions. The study begins by providing an overview of the current state of the automobile industry in Delhi-NCR, highlighting the growing environmental concerns and the need for sustainable transportation alternatives. The research objectives are formulated as:(i) Explore the joint impact of perception factors and consumer awareness on attitudes toward E-Vehicles and analyse the reciprocal relationship between attitudes and purchase intentions. The findings of this study offer valuable insights into the current state of consumer perceptions and attitudes towards E-Vehicles in Delhi-NCR. Additionally, the analysis of government initiatives provides a comprehensive understanding of the policy landscape, which is essential for formulating effective strategies to promote the adoption of sustainable transportation options. The conclusions drawn from this research contribute to the ongoing discourse on the viability and acceptance of E-Vehicles in the Delhi-NCR region. Policymakers, automobile manufacturers, and stakeholders can leverage these findings to devise targeted marketing campaigns, implement appropriate incentives, and develop supportive infrastructures to accelerate the transition to a greener and more sustainable transportation ecosystem in Delhi-NCR.

KEYWORDS: *Electric Vehicles, Consumers, Awareness, Attitude, Perceptions, Government Initiatives, Purchase Intention, Delhi NCR, India.*

Introduction

Global warming has become a major problem for the world and Conventional vehicles are a major cause of global warming and environmental air pollution. All types of vehicles produce dust from brakes, tires, and road wear. The average diesel vehicle has worse effect on air quality than the average gasoline vehicle (EEA 2018) India is a country with the third-largest road network in the world. Road travel seemed to be a preferred choice in India with over 60% of the population used personal or shared

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vehicles to commute (Statista 2020). Consumers often buy products not because of their attributes per se but rather because of the ultimate benefits that these attributes provide, in turn leading to the satisfaction of ultimate values. With the current depletion of fossil fuels and its price hike, there is a need for another energy resource to run the vehicle (Tupe, O. et al 2021). The automobile sector is considering Electric Vehicle as a solution to the industry and environment in India. However, the concept of E Vehicles is unique and helpful for the environment but at a very early stage in the market (Acharya, S.2019).

Literature Review

S. S. Parab (2022) looked examined the numerous aspects influencing a consumer's choice to purchase an electric vehicle. Car owners from India are the study's participants. To analyse the data, structured equation modelling was employed (SEM). When it comes to the adoption of electric vehicles, attitude (ATT) has proven to be a potent mediator.

Indra Gunawan et al. (2022) provided an overview of the factors in Indonesia that motivate the adoption of electric vehicles. Five hundred twenty-six participants from different cities in Indonesia provided responses. The outcomes proved that the model could successfully predict the research variables. The TPB constructs of attitude toward usage (ATU), subjective norm (SN), and perceived behavior control (PBC) help having a favorable attitude about utilizing electric vehicles. ATU considers performance and effort expectations, hedonic motivation, price value, and functional, financial, and social hazards. Another factor, PBC, is influenced by favorable circumstances. Because the ATU factor has the largest influence on EV adoption, other factors such as performance expectations, effort expectations, hedonic motivation, price value, functional risk, financial risk, and social risk must be considered.

Electric car adoption was studied by Prof. Rajesh et al. (2022), who looked at how factors including pricing, social reinforcement, environmental concern, and charging infrastructure impacted the market. The present study used CFA to examine data from 150 respondents across India who was picked at random. Prices have a major effect on the uptake of EVs, according to the study.

Ali, I., and Naushad, M. (2022) identified the key variables affecting the uptake of electric vehicles. Financial incentives, charging infrastructure, environmental concern, & price are five of the independent variables in this study. Adoption of electrical vehicles is the sole dependent variable. 366 individuals from all around India were randomly chosen to provide the data for this study. CFA and SEM were utilised to examine the data. Cost was shown to be a major factor in the study's findings regarding the diffusion of EVs.

Joshi Net. al. (2022) investigated how government policies affect the adoption intentions of EVs by mediating between elements including pricing, EV expertise, and infrastructure requirements. This study offers information that will help decision-makers comprehend the factors that influence EV adoption intentions and develop methods to boost such intentions.

Objective of the Study

Explore the joint impact of perception factors and consumer awareness on attitudes toward E-Vehicles and analyse the reciprocal relationship between attitudes and purchase intentions.

Hypothesis

H₀₁: There is a no impact of perception factors on attitude.

H₀₂: There is no impact of awareness on attitude.

H₀₃: There is no impact of attitude on purchase intention.

Research Methodology

In this study researcher used used deductive approach and researcher used a descriptive and exploratory research design to gather answers through a questionnaire. Researcher collected Data through both primary and secondary data. For the Primary Source researcher used Structured questionnaire for primary data collection. And Data analyzed to test hypothesis and achieve research objectives.

For the Secondary Data Collection: Journals, articles, research papers, news papers, Conference proceedings, Government agency reports and Project report This research has 280 valid filled responses that is sufficient according to the thumb rule, The respondents were selected via no-probability convenient and purposive sampling. SPSS Version 26 and IBM AMOS 26 used for data analysis.

Research Reliability & Validity

Cronbach alpha was also used to assess construct-specific reliability and validity for 80 samples.

Cronbach's Alpha	No of Items
.910	27

Data Analyses

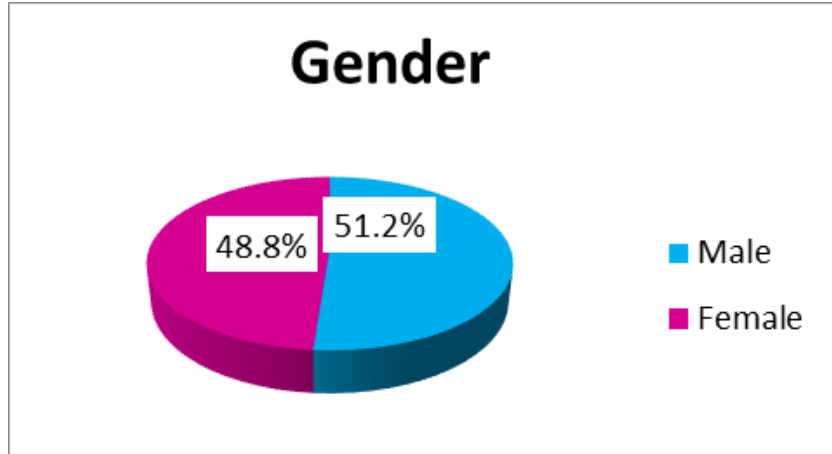


Figure 1

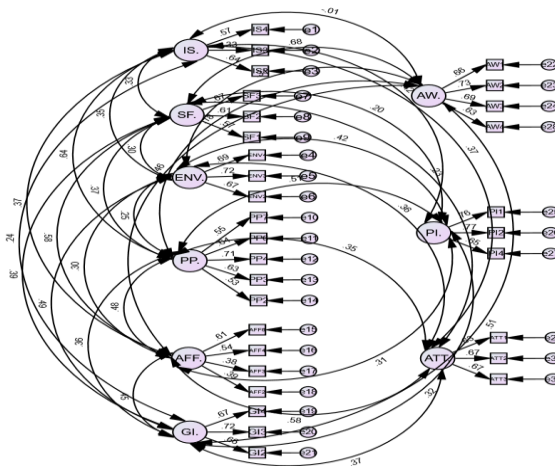


Figure 2

Table 1: Fitness of the Model

Test	Calculated Value	Threshold	Comments
PCMIN/DF	3.366	<5	Model is fit
CFI	0.911	≥0.9	Model is fit
GFI	0.908	≥0.9	Model is fit
RMSEA	0.066	≤0.08	Model is fit
SRMR	0.030	≤0.08	Model is fit

The results indicate that CMIN/df (3.366) is found to be less than 5, GFI (0.908) greater than 0.9 is acceptable, also CFI (0.911) is found to be greater than 0.9 CFI value between 0.8-0.9 is acceptable (Kim et al., 2016). Also, RMSEA (0.106) indicates an acceptable fit and SRMR (0.039) which indicates that the badness of fit is to be found less than 0.08 supports the statistically fitness of the model.

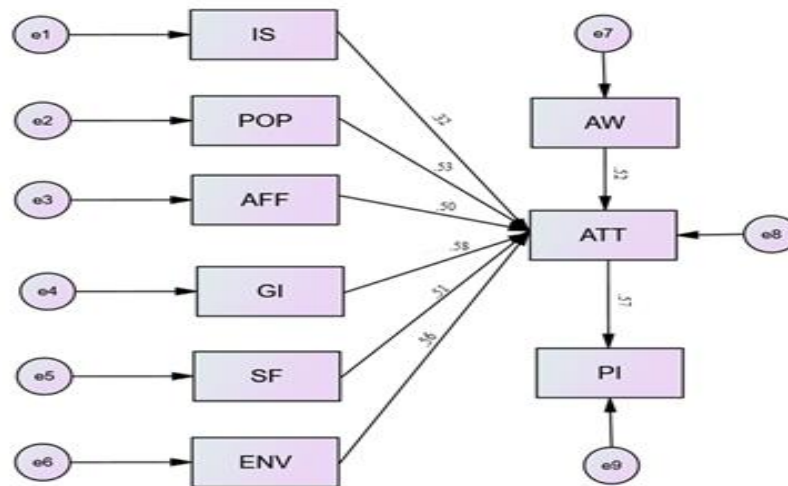


Figure 3

Figure 3 SEM Model representing the relationship between various factors affecting Consumers' Purchase Intention towards Electric Vehicles. The SEM path shows that showed that squared multiple correlations estimated for AW- 0.52 and ATT- 0.57. The R^2 of attitude is 52% which mean awareness has the ability to change of the attitude. A Similarly R^2 of attitude was 0.57 which means attitude can change 57% of purchase intention.

The results of SEM analysis are shown in Table 2.

Table 2: SEM Results

Endogenous Construct	Exogenous Construct	Standardized Regression Estimate	C.R.	P	Remark (Based on null hypothesis)
ATT	AW	.521	2.614	.009	Hypothesis Rejected
ATT	IS	.324	1.031	.303	Hypothesis Accepted
ATT	AFF	.503	4.745	***	Hypothesis Rejected
ATT	POP	.530	4.179	***	Hypothesis Rejected
ATT	GI	.585	5.762	***	Hypothesis Rejected
ATT	SF	.518	2.245	.025	Hypothesis Rejected
ATT	ENV	.564	5.578	***	Hypothesis Rejected
PI	ATT	.572	7.630	***	Hypothesis Rejected

The results of evaluating the aforementioned hypotheses with SEM analysis are presented below.

Except for infrastructure support and attitude, the probability value (p value) of Critical Ratio for all cause-and-effect linkages evaluated in the structural model is less than 5% and has a significance level of 1%. Hence, with a level of confidence of 95%, all null hypotheses of "no impact" , Hence, it is observed:

- There is no impact of perception (infrastructure support) on Attitude.
- There is a positive impact of perception (Affordability) on Attitude.
- There is a positive impact of perception (performance of product) on Attitude.
- There is a positive impact of perception (Government Initiatives) on Attitude.
- There is a positive impact of perception (safety) on Attitude.
- There is a positive impact of perception (Environment concern) on Attitude.
- There is a positive impact of awareness on attitude.
- There is a positive impact of attitude on purchase intention.

Findings from objective: The Impact of Perception Factors on Attitude

Figure 4 of the SEM model represents the relationship between various factors affecting consumers' purchase intentions towards electric vehicles based on the SEM regression results, we found that the significant impact of government "initiatives" had the most significant positive impact on consumer attitude, with a standardized path coefficient of 0.58. This finding underscores the pivotal role of government policies and incentives in shaping positive consumer attitudes towards electric vehicles. whereas infrastructure support has no impact on consumer attitude with a standardized path coefficient value of 0.32.

- **Findings from the impact of awareness on attitude:** The study found that higher awareness levels positively influenced consumer attitudes, with a standardized path coefficient of 0.52. This suggests that being aware of the benefits of electric vehicles contributes to more positive attitudes.
- **Findings from the impact of attitude on purchase intention:** The study further revealed a positive impact of "attitude" on "purchase intention," with a standardized path coefficient of 0.57. This indicates that consumers with more favorable attitudes were more likely to express a willingness to purchase e-vehicles.

Suggestions

For the government awareness campaigns: The government should invest in awareness campaigns to educate consumers about the benefits of electric vehicles. Increased awareness positively influences attitudes and, subsequently, purchase intentions.

- **For Electric Vehicle Manufacturers: Focus on Product Quality:** The positive impact of "Performance of Product" and "Safety" on consumer attitudes underscores the importance of manufacturing high-quality electric vehicles. Manufacturers should prioritize product performance and safety features to improve consumer perceptions.
- **Pricing Strategies:** The factor of "affordability" significantly affects attitudes. Manufacturers should consider price and cost strategies, such as competitive pricing and incentives, to make electric vehicles more affordable for a wider range of consumers.
- **For the Society: Promote Eco-Consciousness:** Encourage and promote environmental awareness in society. The study found that "environment concern" positively influences attitudes. This indicates that consumers are more likely to embrace electric vehicles if they are environmentally conscious.

Future Scope of the Study

The current study was cross-sectional in nature; longitudinal data could be used in future studies.

In future more comprehensive study can be undertaken focusing on other dimension of consumer like cultural and social factors.

References

1. Abbasi, H. A., Johl, S. K., Bt, Z., Shaari, H., Moughal, W., Mazhar, M., Musarat, M. A., Rafiq, W., Farooqi, A. S., & Borovkov, A. (2021). Consumer Motivation By Using Unified Theory of Acceptance And Use Of Technology Towards Electric Vehicles. *Sustainability*, 1–22.
2. Acharya, S. (2019). Consumer Perception Towards Electric Vehicle Industry- A Study On The Role Of Electrical Vehicles In Environmental. *Jetir*, 6(5), 77–102.
3. Adhikary, S., Jalan, N., & Anute, N. (2023). Customers ' Perception About Electric Vehicles. *Journal Of Management Research And Analysis* 2022;9(3):144–149, 9(3), 144–149.
4. Agrawal, S., Kumar, P., Narang, P., & Singh, T. (2020). Challenges To Electric Vehicle Forecasting And Implementation In India. *International Conference of Advance Research and Innovation (Icari-2020) Challenges*, 109–113.
5. Åhman, M. (2006). Government Policy And The Development Of Electric Vehicles In Japan. *Energy Policy*, 34(4), 433–443.
6. Ahmed, M. I., & Dawood, A. K. (2023). Factors Influencing Service Quality Of Electric Vehicles In Factors Influencing Service Quality Of. *Ugc Care*, September 2022.

7. Aijaz, R. (2022). Electric Vehicles in India: Filling the Gaps In Awareness And Policy. *Orf*, 37.
8. Alanazi, F. (2023). Applied Sciences Electric Vehicles : Benefits , Challenges , And Potential Solutions For Widespread Adaptation. *Appl. Sci.*, 13.
9. Ali, I., & Naushad, M. (2022). A Study to Investigate What Tempts Consumers To Adopt Electric Vehicles. *World Electr. Veh.*, 1–15.
10. Ali, M. M. M. (2023). A Study on Consumer Perception Towards Adoption Of E-Vehicle In Sangli City. *The Online Journal of distance Education And E-Learning*, 11(2), 1798–1807.
11. Alia, M. M. M., & Deshmukh, A. A. (2022). E-Vehicle : Literature Review. *International Management Review*, 18, 87–92.
12. Anastasiadou, K., & Gavanas, N. (2022). State-Of-The-Art Review of The Key Factors Affecting Electric Vehicle Adoption By Consumers. *Energies*, 15(24).
13. Arora, S., & Gargava, P. (2023). E-Mobility: Hindrances and Motivators for Policies Implementation in India. *Case Studies on Transport Policy*, 11(August 2021), 100955.
14. Asadi, S., Nilashi, M., Samad, S., Abdullah, R., Mahmoud, M., Alkinani, M. H., & Yadegaridehkordi, E. (2021). Factors Impacting Consumers' Intention Toward Adoption of Electric Vehicles in Malaysia. *Journal Of Cleaner Production*, 282, 124474.
15. Bailey, J., Miele, A., & Aksen, J. (2015). Is Awareness Of Public Charging Associated With Consumer Interest In Plug-In Electric Vehicles ? *Transportation Research Part D*, 36, 1–9.
16. Bakre, A., Pandita, S., & Tripathi, D. (2020). Evolution Of Electric Vehicle Charging Energy Storage Infrastructure in India. 2020 Ieee 17th India Council International Conference, Indicon 2020, 1–7.

