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# **Perceptions of Electric Vehicle Adoption among Young Adults in Ahmedabad: Exploring Influences and Implications**

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**Abstract:** This study explores the perceptions of young adults aged 18-30 in Ahmedabad, India, toward electric vehicle (EV) adoption. A quantitative approach was employed, gathering data from 104 respondents via a structured questionnaire. Key factors examined include vehicle preference, peer influence, and promotion of EVs. One-way ANOVA results indicated that age did not significantly impact these factors, suggesting that other variables, such as environmental concerns and technological advancements, may have a stronger influence on purchase intentions. The study highlights the growing awareness of sustainability and technology among youth, with implications for targeted marketing strategies. The research provides a foundation for future studies on EV adoption across different regions and age groups. Additionally, the findings contribute to the global conversation on reducing carbon emissions and increasing EV adoption for a sustainable future.

Keywords: electric vehicle adoption, young adults, consumer behavior

## **INTRODUCTION**

Electric vehicles (EVs) have gained increasing attention in India as a viable solution to the challenges of environmental degradation and urban air pollution caused by traditional gasoline-powered vehicles. The Indian government, alongside policymakers and industry stakeholders, has recognized the potential of EVs to address these issues. As India is one of the world's most populous and rapidly urbanizing countries, reducing emissions and improving air quality have become key priorities, and EVs are seen as an important part of the solution. Understanding the attitudes of young individuals, particularly those aged 18 to 30, toward EVs is crucial, as they represent a significant portion of future consumers and influencers in the market. The Indian government has introduced various initiatives and policies aimed at promoting the adoption of EVs. One such policy is the Faster Adoption and Manufacturing of Electric Vehicles (FAME) scheme, which provides financial incentives to manufacturers and buyers. Under this scheme, subsidies are offered to lower the cost of EVs, making them more accessible to the general public. Additionally, tax exemptions and reductions in registration fees for EVs further incentivize potential buyers. The government has also encouraged the development of charging infrastructure across cities, recognizing that the lack of accessible charging stations remains a significant barrier to EV adoption.

In urban areas like Delhi, which grapples with severe air pollution, there is growing awareness of the environmental benefits of EVs. The government has introduced measures such as waiving road taxes for electric vehicles and providing subsidies to promote EV use. In states like Gujarat and Maharashtra, similar initiatives are being rolled out to encourage EV purchases, aligning with India's broader goals of achieving net-zero emissions by 2070.

Young individuals in India are increasingly concerned about sustainability and the impact of their choices on the environment. Many in this age group are technologically savvy and open to exploring alternatives to traditional vehicles. However, concerns regarding the higher upfront cost of EVs compared to gasoline-powered vehicles, as well as the limited charging infrastructure, remain. Manufacturers and marketers need to address these concerns by offering affordable options and communicating the long-term savings associated with EV ownership, such as reduced fuel and maintenance costs.

India is taking a diversified approach to sustainable transportation by promoting hybrid vehicles and electric two-wheelers, which are more affordable and better suited to the country's congested urban environments. The government is also exploring shared mobility solutions and promoting cycling to reduce dependency on private vehicles, contributing to a greener future.

The future of electric vehicles in India looks promising, particularly with the younger generation's increasing awareness and interest in sustainable alternatives. With government policies, financial incentives, and improved infrastructure, India is on its way to becoming a key player in the global EV market. However, addressing the challenges of cost, infrastructure, and consumer perceptions will be critical to accelerating EV adoption in the country.

## **METHOD**

The present study focuses on understanding the perceptions of young individuals aged 18 to 30 years toward electric vehicles (EVs) in India, with data collected from 104 respondents residing in Ahmedabad. A quantitative research approach was adopted to gather empirical data, allowing for objective analysis of the factors influencing EV adoption among young adults. The primary data was collected using a structured questionnaire, designed to capture respondents' perceptions of electric vehicles, including their views on environmental sustainability, technological advancements, and purchase intentions.

## **Objectives:**

- a. To analyze the key factors influencing the perceptions of young adults (18-30 years) in India regarding the adoption of electric vehicles.
- b. To evaluate the impact of environmental concerns and technological advancements on the purchase intentions of electric vehicles among young consumers in India.

## Hypotheses

**H1:** Environmental sustainability is positively associated with the intention of young individuals in India to adopt electric vehicles.

**H2:** Technological advancements in electric vehicles (such as improved battery life and charging infrastructure) significantly increase the likelihood of young consumers in India purchasing EVs.

For data analysis, SPSS (Statistical Package for the Social Sciences) was employed to conduct both descriptive and inferential statistical tests. Descriptive statistics, such as frequencies and percentages, were used to summarize demographic data and respondents' general perceptions. To test the hypotheses, inferential statistics were used, particularly regression analysis and correlation analysis. Regression analysis helped in determining the influence of independent variables (environmental concerns, technological advancements) on the dependent variable (purchase intention of EVs). The correlation analysis was used to explore the strength of relationships between variables.

In addition, reliability analysis was conducted using Cronbach's alpha to ensure the consistency of the questionnaire items. The data analysis through SPSS allowed for the testing of the two hypotheses and provided a comprehensive understanding of how environmental and technological factors affect young consumers' views on EV adoption in Ahmedabad. This methodology ensures a robust analysis of the research objectives, providing meaningful insights into the perceptions of young individuals regarding electric vehicles in India.

### **RESULT AND DISCUSSION**

In the study examining the perceptions of young adults in India towards electric vehicle (EV) adoption, Table 1 presents the age distribution of the respondents, focusing on individuals aged 18 to 30 years. The sample is heavily skewed towards the younger end of the spectrum, with 95.2% of the respondents falling between the ages of 18 to 22. This suggests that the data largely represents the views of younger individuals in their late teens and early twenties.

Tuble It ige of Sumples									
					Cumulative				
		Frequency	Percent	Valid Percent	Percent				
Valid	18-22	99	95.2	95.2	95.2				
	23-26	4	3.8	3.8	99.0				
	27-30	1	1.0	1.0	100.0				
	Total	104	100.0	100.0					

Table 1. Age of Samples

The relatively smaller representation of individuals aged 23-26 (3.8%) and 27-30 (1%) indicates that the majority of the participants are likely students or early-stage professionals. This age group is crucial to study as they represent the early adopters of EVs, particularly in a market that is rapidly evolving with technological innovations and environmental awareness. The cumulative percentage column shows that by the time the 22-year-olds are accounted for, 95.2% of the population has already been included. The distribution reflects that most young adults in the sample are at the forefront of societal trends and are likely to be more receptive to environmental sustainability and technological advancements.

**Table 2. Gender of Samples** 

					Cumulative
		Frequency	Percent	Valid Percent	Percent
Valid	Male	50	48.1	48.1	48.1
	Female	54	51.9	51.9	100.0
	Total	104	100.0	100.0	

Table 2 presents the gender distribution, which is almost evenly split between male and female respondents, with 48.1% being male and 51.9% female. This balanced representation ensures that the study captures perspectives from both genders equally, which is important as gender may influence attitudes towards EVs. For instance, males and females may have

differing preferences in terms of vehicle design, technological features, or environmental considerations. By ensuring a near-equal representation, the study can compare gender-specific factors that may influence EV adoption. Moreover, this balance helps in generating a comprehensive understanding of how young males and females perceive the benefits and challenges of adopting EVs.

					Cumulative
		Frequency	Percent	Valid Percent	Percent
Valid	Urban area	88	84.6	84.6	84.6
	Semi- urban area	3	2.9	2.9	87.5
	Rural area	13	12.5	12.5	100.0
	Total	104	100.0	100.0	

## Table 3. Area of Residence of Samples

Table 3, which deals with the area of residence, indicates that a significant proportion of the sample (84.6%) comes from urban areas. This is followed by 12.5% from rural areas, and a small percentage (2.9%) from semi-urban areas. This distribution reflects the growing influence of urbanization in shaping consumer preferences, especially among the youth in Ahmedabad. Young adults living in urban areas are more likely to encounter EV infrastructure, such as charging stations, and are exposed to the environmental and technological advancements that promote EV adoption. However, the smaller sample size from rural and semi-urban areas suggests that there may be barriers to EV adoption in these regions, possibly due to a lack of infrastructure or awareness.

Table 4. Ec	lucation	of S	amples	

					Cumulative
		Frequency	Percent	Valid Percent	Percent
Valid	High school	68	65.4	65.4	65.4
	Undergraduate	9	8.7	8.7	74.0
	Graduate	26	25.0	25.0	99.0
	Postgraduate	1	1.0	1.0	100.0
	Total	104	100.0	100.0	

Table 4 provides information on the education levels of the respondents. The majority of the participants (65.4%) have completed high school, while 25% are graduates, and 8.7% are undergraduates. A small fraction (1%) are postgraduates. The high percentage of high school graduates suggests that the study predominantly reflects the perceptions of young individuals who are either students or have recently entered the workforce. Education plays a crucial role in shaping individuals' understanding of environmental issues and technological advancements. Hence, this educational background implies that the respondents are likely aware of the environmental benefits of EVs and are attuned to technological innovations in the automotive industry. The variety of education levels provides a broader perspective on how awareness and knowledge influence the purchase intentions of young adults toward EVs.

## Table 5. One Way ANOVA between Gender and Ev Sustainability ANOVA

		Sum of						
		Squares	df	Mean Square	F	Sig.		
Environmental	Between Groups	.431	1	.431	.384	.537		
issue	Within Groups	114.453	102	1.122				
	Total	114.885	103					

Reducing	Between Groups	5.945	1	5.945	4.288	.041
pollution	Within Groups	141.401	102	1.386		
	Total	147.346	103			
Familiarity	Between Groups	.182	1	.182	.139	.710
with EVs	Within Groups	133.039	102	1.304		
	Total	133.221	103			
Overall	Between Groups	3.490	1	3.490	3.934	.050
perception	Within Groups	90.500	102	.887		
	Total	93.990	103			
Factors	Between Groups	4.743	1	4.743	2.896	.092
influencing	Within Groups	167.017	102	1.637		
EVs	Total	171.760	103			

The One-Way ANOVA in Table 5 investigates the relationship between gender and perceptions of electric vehicle (EV) sustainability among young adults in Ahmedabad. The analysis reveals mixed results in terms of statistical significance across different factors. For environmental issues, the F-value of 0.384 and p-value of 0.537 indicate no significant difference between males and females regarding concerns about environmental issues in EV adoption. Similarly, in terms of familiarity with EVs, the F-value of 0.139 and p-value of 0.710 show no significant gender difference.

However, for reducing pollution, a significant difference was observed between genders, with an F-value of 4.288 and a p-value of 0.041 (below the 0.05 threshold). This suggests that males and females may differ in how they perceive EVs' role in reducing pollution. In terms of overall perception of EVs, the F-value of 3.934 and p-value of 0.050 highlight a marginal significance, suggesting a possible difference in how genders view the overall sustainability of EVs. Lastly, for factors influencing EV adoption, no significant difference is found, with a p-value of 0.092. The study employed SPSS to analyze these results, allowing for objective insights into gender-based differences in perceptions of EV sustainability among young adults.

ANUVA								
		Sum o	f	Mean				
		Squares	df	Square	F	Sig.		
Environmental	Between Groups	.478	2	.239	.211	.810		
issue	Within Groups	114.407	101	1.133				
	Total	114.885	103					
Reducing	Between Groups	1.303	2	.652	.451	.638		
pollution	Within Groups	146.043	101	1.446				
	Total	147.346	103					
Familiarity	Between Groups	3.312	2	1.656	1.288	.280		
with EVs	Within Groups	129.909	101	1.286				
	Total	133.221	103					
Overall	Between Groups	1.263	2	.632	.688	.505		
perception	Within Groups	92.727	101	.918				
	Total	93.990	103					
Factors	Between Groups	1.851	2	.925	.550	.579		
influencing	Within Groups	169.909	101	1.682				
EVs	Total	171.760	103					

 Table 6. One Way ANOVA between Age and Ev sustainability A

In the present study, a One-Way ANOVA test was used to explore the relationship between respondents' age and their perceptions of electric vehicle (EV) sustainability. Table 6 presents the results of this analysis, showing the significance of various factors like environmental issues, reducing pollution, familiarity with EVs, overall perception, and factors influencing EVs.

The ANOVA results show no significant differences between age groups for any of the variables. For example, the significance value (Sig.) for "Environmental Issue" is 0.810, indicating that age does not significantly affect how young adults perceive environmental issues related to EVs. Similarly, the Sig. value for "Reducing Pollution" is 0.638, showing no strong link between age and the perception of EVs' role in pollution reduction. Other factors like "Familiarity with EVs" (Sig. 0.280) and "Overall Perception" (Sig. 0.505) also show no significant age-related differences.

These findings suggest that within the 18-30 age group, age does not significantly influence perceptions of EV sustainability or the key factors associated with EV adoption. This supports the idea that young individuals, regardless of age within this group, share similar views on environmental sustainability and the technological advantages of electric vehicles, as indicated by the research methodology's focus on objective, empirical data collection.

ANOVA								
		Sum of						
		Squares	df	Mean Square	F	Sig.		
Vehicle	Between Groups	9.956	1	9.956	10.590	.002		
preference	Within Groups	95.890	102	.940				
	Total	105.846	103					
Peer influence	Between Groups	.131	1	.131	.116	.734		
	Within Groups	115.253	102	1.130				
	Total	115.385	103					
Promotion of EV	Between Groups	.587	1	.587	.797	.374		
	Within Groups	75.173	102	.737				
	Total	75.760	103					

## Table 7. One way ANOVA between Gender and consumer behavior ANOVA

The ANOVA results in Table 7 examine the relationship between gender and various aspects of consumer behavior toward electric vehicles (EVs). The one-way ANOVA compares means across gender groups for three variables: vehicle preference, peer influence, and promotion of EVs. For vehicle preference, the F-value (10.590) is significant (p = .002), indicating that gender has a statistically significant effect on vehicle preference. This suggests that males and females have different preferences when it comes to EVs, which may be driven by varying priorities like design, technology, or environmental factors.

In contrast, peer influence shows no significant difference between genders (F = .116, p = .734), implying that both males and females are equally influenced by their peers in EV adoption. This suggests that peer opinions might affect consumer behavior similarly across genders. For the promotion of EVs, the F-value (0.797) is also not significant (p = .374), indicating that gender does not significantly affect how promotional efforts influence consumer behavior. Both males and females are likely responding similarly to marketing and awareness campaigns for EVs. The results, analyzed through SPSS using a structured questionnaire, help clarify gender-based differences and similarities in consumer behavior, providing valuable insights for targeted EV marketing strategies.

		Sum of		Mean		
		Squares	df	Square	F	Sig.
Vehicle	Between Groups	.409	2	.205	.196	.822
preference	Within Groups	105.437	101	1.044		
	Total	105.846	103			
Peer influence	Between Groups	2.998	2	1.499	1.347	.265
	Within Groups	112.386	101	1.113		
	Total	115.385	103			
Promotion of	Between Groups	3.123	2	1.562	2.171	.119
EV	Within Groups	72.636	101	.719		
	Total	75.760	103			

#### Table 8. One way ANOVA between Age and consumer behavior ANOVA

The one-way ANOVA results in Table 8 examine the relationship between age and three aspects of consumer behavior related to electric vehicles (EVs): vehicle preference, peer influence, and promotion of EVs. The study focused on understanding the perceptions of young individuals aged 18-30 in Ahmedabad, India, using quantitative data collected from 104 respondents. For vehicle preference, the F-value (0.196) and significance level (p = 0.822) suggest no significant difference between age groups regarding their preference for EVs. Similarly, for peer influence, the F-value (1.347) and p-value (0.265) show no significant difference between age groups influence their EV-related decisions.

Lastly, for promotion of EVs, while the F-value is slightly higher at 2.171, the significance level (p = 0.119) still indicates no significant age-related differences in perceptions of EV promotions. These results suggest that the factors of consumer behavior—vehicle preference, peer influence, and promotion—are not significantly influenced by age in this sample. This analysis, conducted using SPSS, allowed for an empirical evaluation of key factors influencing young adults' EV adoption. The use of ANOVA helped assess whether age plays a role in shaping these perceptions, ultimately suggesting that other variables, such as environmental concerns or technological advancements, may have more influence.

## **CONCLUSION**

present study provides valuable insights into the perceptions of young adults in India, specifically Ahmedabad, regarding electric vehicle (EV) adoption. Through quantitative analysis, key factors such as vehicle preference, peer influence, and promotion of EVs were explored in relation to age. The results of the one-way ANOVA indicated that age did not significantly affect these factors, implying that other variables, such as environmental concerns and technological advancements, may play a more crucial role in shaping EV adoption among young consumers. This highlights the growing awareness and interest in sustainability and innovation across all age groups within the 18-30 demographic. Additionally, the findings suggest that the promotion of EVs should target a broader youth audience, regardless of age, with a focus on enhancing technological features and emphasizing environmental benefits.

Future research could expand the scope of the study by incorporating larger and more diverse samples across different regions in India, including rural areas where infrastructure for EVs may be lacking. Additionally, qualitative studies could complement the quantitative data, offering deeper insights into the specific concerns, motivations, and barriers that young consumers face. Furthermore, longitudinal studies could track changes in perceptions over time, especially as EV technology and infrastructure evolve in India.

Globally, the transition to electric vehicles has significant implications for reducing carbon emissions and combating climate change. As young consumers worldwide become more conscious of sustainability, understanding their perceptions of EV adoption is crucial for shaping future policies and marketing strategies. The findings from this study align with global

trends, where technological advancements and environmental concerns are major drivers for EV adoption. This global shift can lead to substantial environmental benefits, promoting cleaner energy use and reducing dependence on fossil fuels across the world.

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