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Exploring Consumer's Attitudes Towards Electric Vehicle And Their Role In Promoting Sustainable Mobility

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Abstract:

This study explores consumer perceptions towards electric vehicle adoption and its contribution to sustainable transportation. A quantitative survey was conducted across diverse urban and semi-urban regions, focusing on factors such as government policy support, economic feasibility and environmental awareness. The results indicate that government initiatives including supporting policies and infrastructure development are widely viewed as essential drivers of electric vehicle adoption. Consumer awareness emerged as a key influencer, with most respondents recognizing the importance of being informed about the benefits of green transportation. While attitudes towards affordability were generally positive, there were noticeable differences in how well participants understood the long-term advantages of electric vehicles. Stimulatingly, cost related concerns did not appear to significantly prevent purchase intention. The study highlights the critical role of awareness campaigns and consistent government efforts in fostering a favorable environment for electric mobility, ultimately supporting broader sustainable goals.

Index Terms: Electric Vehicles Consumer Perceptions, Environmental Awareness, Public Attitude, Transportation Sustainability.

Introduction:

Air pollution is a major environmental and public health challenge in many urban areas worldwide. A significant portion of this pollution comes from vehicles powered by gasoline and diesel fuel. These vehicles emit harmful gases such as carbon dioxide, nitrogen oxides, and particulate matter. These emissions contribute to climate change, degrade the air quality and increase health risk like respiratory disease. With rapid urbanization and increased vehicle ownership, the demand for transportation continues to rise. This trend makes it essential to find cleaner and more suitable transportation options. Electric vehicles have emerged as promising alternatives because they operate using electricity and produce little or no tailpipe emissions. Governments around the world, including India have introduced policies, incentives and infrastructure development programs to promote the adoption of electric vehicles. Despite these efforts, the adoption rate of electric vehicles remains relatively low in many regions. Several factors influence consumer decisions to adopt or reject electric vehicles, including the

upfront cost, lack of awareness, concerns about performance and range and the availability of charging infrastructure. Understanding consumer perceptions and the barriers to electric vehicle adoption is critical for designing effective policies and strategies to encourage sustainable transportation. The study focuses on exploring how government initiatives, consumer affordability and environmental awareness influence consumers perception and intention toward adopting electric vehicles. By analysing these factors, the research aims to provide valuable insights that can help policymakers, manufacturers and environmental organizations develop targeted approaches to increase electric vehicle adoption. Ultimately promoting the use of electric vehicles can contribute to reducing urban population and advancing environmental sustainability.

Significance of the study:

This study holds both academic and practical significance. As India moves toward a greener transportation system, understanding the real drivers of consumer behavior becomes essential. The findings of this research can help policymakers to develop various incentive programs, awareness campaigns and infrastructure development to better align with consumer needs. It also provides automobile companies with insights into what potential electric vehicle buyers prioritize, allowing for more targeted marketing and product design. It can also contribute to the academic literature on sustainable transportation by offering a forecast, data-driven analysis of electric vehicle perception in an under researched region. It can also offer actionable guidance for local and national authorities aiming to reduce urban pollution and meet their sustainability goals. By focusing on the public attitude towards electric vehicles and its relation to key influencing factors, the study contributes to the broader effort of promoting clean and sustainable mobility in India.

Literature Review:

1. (Rezvani, Jansson, & Bodin, 2015) reviewed many articles to understand why consumers decide to buy electric vehicles. They found that caring about the environmental health, but it is not enough by itself to make people buy electric vehicles. Practical problems like not enough charging stations, worries about new technology and higher price compared to regular cars keep buyers away. The authors suggested that future research should explore how people's thought, feelings and social situations influence their decisions. They argued for such studies that makes psychological ideas with real life factors to better predict electric vehicle buying behavior.

2. (Egbue & Long, 2012) studied how people in the US feel about electric vehicles and what stops them from buying. They found that the main problems were technical like limited driving range, slow charging times and not enough places to charge. Even though many people care about the environment, they often worry that electric vehicle would not work well for daily use. The study showed that until these technical issues and concerns are fixed and people learn more about electric vehicle benefits, adoption will be slow, no matter what incentives are offered.

3. (Li, Long, & Chen, 2016) found that subsidies and tax breaks made a positive difference, but the biggest factor was whether people felt the policies matched their own environmental values. Many people outside big cities did not fully understand the policies. The study recommended that the government improve how it communicates and implement these programs, especially in smaller cities to build public trust and encourage more people to choose electric vehicles.

4. (Coffman, Bernstein, & Wee, 2016) reviewed existing research on electric vehicle adoption, focusing on money, behavior and policy. They found that while financial incentives like tax credits help increase sales temporarily, long term changes come from social influences, brand reputation and people's concern for the environment. lack of awareness and misinformation about electric vehicle remain big barriers. The researchers suggested that policies work best when combined with education and better infrastructure helping people feel more confident about switching to electric vehicles.

Research Gap:

Several previous studies have explored the benefits of electric vehicles and their potential to reduce pollution and improve sustainability. Some previous researchers have analysed fuel consumption patterns, other researchers have discussed traffic congestion or the future of electric vehicle infrastructure. However, most of the studies have the limitations of generalized data that may not reflect current consumer behavior in rapidly changing markets in India. A lack of focused analysis of consumer perception, especially considering psychological and financial dimensions. Minimal attention to specific regional context particularly in semi urban areas in India. Few studies have examined combinations of influencing factors such as economic feasibility and environmental concern to determine their joint impact on electric vehicle adoptions. This study addresses these gaps by using primary data from selected urban and semi-urban areas in West Bengal and by analysing not only individual factors but also how combinations of factors shape public perception towards electric vehicle adoption.

Objective of the Study:

The primary objective of this study is to understand the factors that shape consumer attitudes towards adoption of electric vehicles in selected regions of West Bengal. The specified objectives are:

1. To examine the level of policy support provided by administration for promoting electric vehicle usage.
2. To evaluate the role of economic visibility in influencing consumer decisions related to electric vehicle adoption.
3. To assess the impact of environmental consciousness on consumer attitude towards sustainable transportation. To analyse the interrelationship between these influencing factors and public attitude towards electric vehicle adoption. To identify which combination of influencing factors has the most significant impact on shaping consumer perception.

Research Methodology:

Research design: This research uses a quantitative approach to investigate the key factors influencing individual attitudes toward adoption of electric vehicles in selected urban and semi urban areas of West Bengal India. Primary data was gathered through a structured questionnaire aimed at capturing respondent opinions on areas influencing aspects such as affordability, awareness and policy influence.

Sample Data Collection: A total of 58 valid responses were collected through an online survey distributed via Google forms. The target respondents were from the areas of Kolkata, Howrah, Greater Kolkata and many other regions from West Bengal. This region was selected to reflect a mix of both urban and semi urban population groups. The data collection took place in between the months of June to mid of August 2025.

Survey Design: the questionnaire considered nine items each designed using a Five-point Likert scale ranging from Strongly Disagree that is 1 to Strongly Agree that is 5. The variables examined in this study are:

Influencing variables:

(a) Policy support: Efforts by government to promote electric vehicle usage (IV 1)

(b) Economic feasibility: The financial capability of consumers to purchase electric vehicle (IV 2)

(c) Environmental consciousness: Awareness and concern about environmental issues (IV 3)

Public Attitude: Attitude towards electric vehicle adoption that is the perception and willingness

Each influencing factor was measured using three individual items to ensure sufficient data points for analysis.

Data Analysis Methods: All collected data were analysed using SPSS software. The following techniques were used:

Descriptive statistics: Provided a summary of overall response trends and demographic details such as mean, standard deviation etc.

Reliability testing: Internal consistency of the survey instrument was tested using Cronbach's alpha. A reliability coefficient of 0.70 or higher was considered acceptable for each factor group.

Correlation analysis: the Pearson correlation coefficient was applied to evaluate the strength and direction of relationship between the influencing factors and public attitude towards electric vehicle adoption.

The analysis was conducted to determine which group of factors most significantly affects public interest in transitioning to electric vehicles.

Data Analysis & Findings:

Descriptive Statistics:

What is the average level of agreement among consumers regarding government initiatives, cost concerns and awareness toward electric vehicle adoption and how do these perceptions vary?

Table 01: showing Descriptive Statistics

Descriptive Statistics					
Particulars	**N**	**Minimum**	**Maximum**	**Mean**	**Std. Deviation**
Govt policies improve adoption (subsidies, tax)	58	1	5	4.40	0.815
Govt initiatives make adoption likely	58	1	5	4.38	0.914
Govt support (charging stations) help adoption	58	1	5	4.33	0.925
EVs are sustainable and eco-friendly	58	1	5	4.31	0.940
Cost and charging are barriers to adoption	58	2	5	4.22	0.899
EV purchase will increase due to benefits	58	1	5	4.10	0.968
Awareness helps promote green alternatives	58	2	5	4.60	0.647
Consumer awareness affects choices	58	1	5	4.33	0.962
Well-informed about environmental + financial benefits of green transport	58	1	5	3.95	1.146
Valid N	58				

Source: Author's Calculation from Primary Data Collection

Interpretation: Descriptive statistics were employed to understand the general response pattern of participants regarding the adoptions of electric vehicles and associated influencing factors. A total of 58 responses were analyzed, covering a range of perceptions on government initiatives, consumer awareness and

environmental consciousness as well as affordability concerns. The results indicate a strong positive perception towards government policies and initiatives. Specifically, the statement that government policies improve adoption receive the highest mean score of 4.40 reflecting substantial agreement among respondents. Similarly, questions related to government efforts in infrastructure development were also stored above 4.30, underscoring the critical role of public policy in facilitating electric vehicle adoption. Among all the items the highest mean score was observed for awareness help promote green alternatives at 4.60, suggesting that most respondents believe awareness plays an essential role in driving eco-friendly transportation choices. This finding aligns with consumer awareness affects choices, where awareness was again seen a strong influencing factor scoring 4.33 on average. The target variable that is electric vehicle purchase will increase due to benefits had a mean of 4.10 showing a favorable inclination toward electric vehicle purchase based on their economic and environmental advantages. However, this also had a relatively higher standard deviation 0.968 indicating some variability in respondent's opinions. Stimulatingly, well informed about environmental and financial benefits recorded the lowest mean score at 3.95 and the highest standard deviation 1.146. This suggests a notable knowledge gap or inconsistency in how well participants understand the optimistic view of electric vehicle adoption, strongly driven by government support and consumer awareness. However, discrepancies in awareness level highlight the need for targeted information campaigns to bridge the knowledge gap and enhance informed decision making among potential electric vehicle consumers.

Reliability Analysis:

Are the survey items measuring each concept internally consistent and reliable?

Table 02: Showing Reliability Analysis

Reliability Analysis		N	%
Cases	Valid	58	100.0
	Excluded	0	.0
	Total	58	100.0
Reliability Statistics			
Cronbach's Alpha		N of Items	
0.682		9	

Source: Author's Calculation from Primary Data Collection

Interpretation: Reliability analysis was conducted to assess the internal consistency of the survey instrument, which consist of nine items measuring perceptions related to government policies, awareness, barriers and the adoption of electric vehicles. The Cronbach alpha coefficient was calculated to determine the extent to which items measure the same underlying concept. The result shows an alpha value of 0.682. In general, a Cronbach alpha value of 0.7 or higher is considered acceptable for most social science research, indicating good internal consistency among the items. Although the obtained value of 0.682 is slightly below this threshold, it is still within an acceptable range especially for exploratory studies or initial stages of research. This moderate reliability suggests that at the survey objects are reasonably consistent in measuring the attitudes and perceptions regarding green transportation and electric vehicle adoption. Overall, the reliability analysis supports the use of this questionnaire for further statistical analysis and provides confidence that the responses reflect clear constructs relevant to the research objectives.

Correlation Analysis:

What is the strength and direction of the relationship among policy support, economic feasibility and the environmental consciousness to adopt electric vehicles?

Table 03: Showing Correlations

		Govt policies improve adoption (subsidies, tax)	Govt initiatives make adoption likely	Govt support (charging stations) help adoption	Cost and charging are barriers to adoption	EV purchase will increase due to benefits	Consumer awareness affects choices	Well-informed about environmental awareness + financial benefits of green transportation
Govt policies improve adoption (subsidies, tax)	Pearson Correlation	1	0.571	0.081	-0.052	0.303	0.279	0.492
	Sig. (2-tailed)		0	0.547	0.701	0.021	0.034	0
	N	58	58	58	58	58	58	58
Govt initiatives make adoption likely	Pearson Correlation	.571	1	-0.025	-0.041	.391	.275	0.186
	Sig. (2-tailed)	0		0.852	0.759	0.002	0.037	0.161
	N	58	58	58	58	58	58	58
Govt support (charging stations) help adoption	Pearson Correlation	0.081	-0.025	1	0.184	0.04	-0.202	-0.133
	Sig. (2-tailed)	0.547	0.852		0.166	0.766	0.129	0.321
	N	58	58	58	58	58	58	58
Cost and charging are barriers to adoption	Pearson Correlation	-0.052	-0.041	0.184	1	0.013	0.035	0.233
	Sig. (2-tailed)	0.701	0.759	0.166		0.922	0.792	0.079
	N	58	58	58	58	58	58	58
EV purchase will increase	Pearson Correlation	0.303	0.391	0.04	0.013	1	0.377	0.1
	Sig. (2-tailed)	0.021	0.002	0.766	0.922		0.003	0.456

due to benefits	N	58	58	58	58	58	58	58
Consumer awareness affects choices	Pearson Correlation	0.279	0.275	-0.202	0.035	0.377	1	0.350
	Sig. (2-tailed)	0.034	0.037	0.129	0.792	0.003		0.007
	N	58	58	58	58	58	58	58
Well-informed about environmental awareness+ financial benefits of green transportation	Pearson Correlation	.492	0.186	-0.133	0.233	0.1	.350	1
	Sig. (2-tailed)	0	0.161	0.321	0.079	0.456	0.007	
	N	58	58	58	58	58	58	58

Source: Author's Calculation from Primary Data Collection

Interpretation:

1. **Government policies and electric vehicle purchase intention:** In the above table Pearson correlation 0.303, P value 0.021, which indicates there was a significant positive correlation between government policies and electric vehicle purchase intention. This means that as respondents perceive government policies to be more favorable, their likelihood of purchasing an electric vehicle increases. The relationship is statistically significant, that is P value < 0.05, suggesting a stronger government policy may encourage higher electric vehicle adoption.
2. **Government initiatives and electric vehicle purchase intention:** In the above table Pearson correlation 0.391, P value 0.002 a significant positive correlation was found between government initiatives (i.e. rebates, charging station infrastructure) and electric vehicle purchase intention. This suggests that as respondents perceive government initiative as more effective, their intention to adopt electric vehicles also increases. The relationship is statistically significant that P value < 0.01, indicating that government initiatives play a strong role in influencing electric vehicle adoption.
3. **Consumer awareness and electric vehicle purchase intention:** India above table Pearson correlation 0.377 and P value 0.003 suggested consumer awareness of green transportation options is positively correlated with electric vehicle purchase intention. As awareness about the environmental and financial benefit of electric vehicles increases, it may be likely to adopt electric vehicles. This is a moderate positive correlation, and the relationship is statistically significant, that is P value < 0.01.
4. **Consumer awareness and well informed: A**s Pearson corrected 0.350, P value 0.007 suggested there was a positive correlation between consumer awareness and being well informed about the environmental and financial benefits of electric vehicles. As awareness increases, individuals feel more informed about the advantages of green transportation, which may influence their decision to adopt electric vehicles. The relationship was statistically significant, that is P value < 0.01.
5. **Government policies and consumer awareness:** As Pearson correlation 0.279, P value 0.034 showed there was a positive correlation between government policies and consumer awareness of green transportation. This suggests that respondents who view government policies positively are also likely to perceive consumer awareness as an influencing factor in their decision making. The relationship is statistically significant that its P value is less than 0.05.
6. **Government policies and charging station support:** In the above table Pearson correlation 0.081 and P value 0.547 showed no significant correlation was found between government policies and government support for charging stations. This means that perception of management policies does not strongly

influence perception about charging infrastructure, with no statistically significant relationship that the P value > 0.05.

7. **Cost barriers and electric vehicle purchase intention:** As Pearson correlation -0.013, P value 0.922 suggested cost barriers (i.e. high vehicle prices, lack of charging infrastructure) did not significantly correlate with electric vehicle purchase intention. The very low correlation value suggests that perceived cost barriers have little to no impact on the intention to purchase an electric vehicle. This relationship was not statistically significant, that is, the P value is greater than 0.05.

Conclusion:

In light of the above analysis, it is found that government policies and initiatives have a positive impact on electric vehicle purchase intention, which means that favorable policies and initiatives encourage consumers to consider adopting electric vehicles. Consumer awareness about green transportation significantly influences electric vehicle adoption with increased awareness correlating strongly with higher purchase intention. Cost barriers do not show a significant relationship with electric vehicle purchase intention, suggesting that other factors such as government support and awareness play a more substantial role in shaping consumer decisions. The results of the correlation analysis support the idea that government policies and consumer awareness are significant predictors of electric vehicle adoption. Although cost barriers are often considered as a concern, they do not seem to strongly affect the intention to adopt electric vehicles in this area.

Recommendations:

This study is limited to Primary data analysis. The findings provide a solid foundation for further exploration through more advanced statistical techniques such as regression analysis to understand the predictive power of these variables on electric vehicle adoptions.

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