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A STUDY ON CONSUMER PERCEPTION REGARDING ELECTRONIC VEHICLES IN DELHI NCR

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ABSTRACT
"Electronic vehicles have emerged as an important alternative to conventional fuel-powered vehicles with the increasing environmental concerns, rising fuel prices and the growing need for sustainable transportation. In addition, alarms related to limited charging stations, long charging duration, battery life, resale value and range anxiety continue to act as barriers to adoption for many potential buyers. On the other hand, increasing fuel prices, supportive government policies, tax benefits and rising environmental awareness are encouraging consumers to consider EVs as a viable long-term solution. The perception of EVs may also vary across different demographic groups based on age, income, education level, occupation, and geographical location. The study focuses on understanding the factors that influence customer perception and acceptance of EVs".

Keywords: Electronic, Environmental, Perception

INTRODUCTION
"The automobile industry has undergone a significant transformation in recent years with the emergence of electronic vehicles (EVs) as an alternative to conventional fuel-powered vehicles. Growing concerns regarding environmental pollution, climate change, rising fuel prices and depletion of fossil fuel resources have encouraged governments, manufacturers, and consumers to shift toward sustainable transportation solutions. Electronic vehicles, commonly referred to as electric vehicles, operate using electric motors powered by rechargeable batteries, thereby reducing dependence on petroleum products and minimizing carbon emissions".

"The increasing adoption of EVs is supported by technological advancements, government incentives, expansion of charging infrastructure and growing environmental awareness among consumers. Many countries, including India have introduced policies and subsidies to promote EV usage under sustainable development initiatives. Despite these efforts, consumer acceptance of electric vehicles remains influenced by several factors such as price, battery life, charging facilities, driving range, maintenance cost, brand image and environmental consciousness".

Customer perception plays a crucial role in determining the success and market growth of electronic vehicles. Understanding how consumers perceive EVs helps manufacturers and policymakers identify the barriers and motivations affecting purchase decisions. Positive perceptions regarding eco-friendliness, low operating costs and innovation can enhance adoption, while concerns about charging infrastructure, high initial costs and battery performance may limit consumer interest. Therefore, studying customer perception toward electronic vehicles is essential for evaluating market readiness and developing effective strategies to increase EV adoption.

This study aims to analyse customer perception regarding electronic vehicles by examining the influence of demographic factors, awareness levels, economic considerations and consumer attitudes toward the adoption and usage of EVs.

REVIEW OF LITERATURE
Several researchers have examined customer perception and adoption behaviour toward electronic vehicles from different perspectives.

Ajzen (1991) proposed the Theory of Planned Behavior, which describes that consumer intentions and attitudes significantly affect the purchasing behavior. This theory has been widely applied in studies related to electric vehicle adoption, where environmental concern and perceived efficacy affect consumers' intention to purchase electronic vehicles.

Eberhard Rogers (2003) "emphasized in the Diffusion of Innovation Theory that technical innovations are accepted gradually depending on consumer awareness, compatibility and perceived advantages. In the context of electronic vehicles, early adopters are generally environmentally conscious and technologically oriented consumers".

A study led by **Rezvani, Jansson, and Bodin (2015)** "found that environmental awareness, social influence and economic benefits positively affect consumers' attitudes toward electric vehicles. However, concerns regarding charging infrastructure and battery performance were identified as major barriers to adoption".

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Kumar and Alok (2020) "inspected customer perception toward electric vehicles in India and perceived that rising fuel prices and government incentives significantly encourage consumers to consider EVs. The study also exposed that lack of awareness and limited charging facilities reduce consumer confidence in adopting electric vehicles".

Singh and Mishra (2021) "examined factors affecting EV purchase intentions and concluded that income level, education and environmental concern positively affect customer perception. The research further highlighted that younger consumers are more willing to adopt electric vehicles compared to older age groups".

Hardman et al. (2018) "highlighted that financial incentives, technological advancements, and improved battery efficiency are key determinants influencing EV adoption globally. Their findings suggested that consumer trust in vehicle performance and charging accessibility plays a major role in shaping perceptions".

"The existing literature indicates that customer perception regarding electronic vehicles is influenced by economic, technological, environmental and social factors. Although awareness and interest in EVs are increasing, challenges such as high purchase cost, inadequate charging infrastructure and limited driving range continue to affect consumer acceptance".

RESEARCH METHODOLOGY

The present study aims to examine customers' perceptions regarding the adoption and usage of electronic vehicles (EVs). A quantitative research approach has been adopted to collect and analyze data from respondents.

OBJECTIVE OF THE STUDY

- To study the perception level of customer regarding the use of electronic vehicles

Sample Size: 111

Data Collection: Primary data were collected directly from respondents through a structured questionnaire designed to measure customer perception regarding electronic vehicles. Demographic variables such as gender, age, educational qualification, marital status, occupation, income and residence has been taken. Further research statements on five point likert scale has been taken.

Statistical Tools: The collected data were analysed with the help of statistical tools such as Descriptive Statistics and ANOVA.

Data Analysis and Interpretation

Gender					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	Male	76	68.5	68.5	68.5
	Female	35	31.5	31.5	100.0
	Total	**111**	**100.0**	**100.0**	

The table presents that out of 111 respondents regarding gender distribution, 76 respondents were male, representing 68.5% of the total sample, while 35 respondents were female, accounting for 31.5%. The cumulative percentage shows that males constituted the first 68.5% of the sample and the inclusion of females completed the total to 100%. This indicates that the study sample was predominantly male, with more than two-thirds of the respondents being men, whereas females formed less than one-third of the participants.

Age					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	Below 20	43	38.7	38.7	38.7
	21- 40	58	52.3	52.3	91.0
	41- 60	9	8.1	8.1	99.1
	Above 61	1	.9	.9	100.0
	Total	**111**	**100.0**	**100.0**	

The table shows the age distribution of the 111 respondents included in the study. The majority of participants belonged to the 21–40 years age group with 58 respondents accounting for 52.3% of the total sample. This was followed by respondents below 20 years of age, who numbered 43 and represented 38.7% of the participants. A smaller proportion of respondents, 9 individuals (8.1%), fell within the 41–60 years age category, while only 1 respondent (0.9%) was above 61 years of age. The cumulative percentages indicate that 91.0% of the

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respondents were aged 40 years or below, demonstrating that the sample was largely composed of younger individuals.

Highest Education					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	Matric	6	5.4	5.4	5.4
	Senior Secondary	36	32.4	32.4	37.8
	Graduate	34	30.6	30.6	68.5
	Post graduate	27	24.3	24.3	92.8
	Others	8	7.2	7.2	100.0
	Total	**111**	**100.0**	**100.0**	

The table indicates that out of the 111 respondents the largest group of respondents had completed Senior Secondary education, comprising 36 individuals or 32.4% of the total sample. This was closely followed by Graduates, with 34 respondents representing 30.6%, and Postgraduates, with 27 respondents accounting for 24.3%. A smaller proportion of respondents had education up to Matric level, totaling 6 individuals or 5.4%, while 8 respondents (7.2%) belonged to the "Others" category, indicating qualifications outside the listed educational levels. The cumulative percentages reveal that 68.5% of the respondents had at least Senior Secondary to Graduate-level education, while a substantial proportion had attained higher education qualifications.

Marital status					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	Married	29	26.1	26.1	26.1
	Unmarried	78	70.3	70.3	96.4
	Divorced	3	2.7	2.7	99.1
	Widow	1	.9	.9	100.0
	Total	**111**	**100.0**	**100.0**	

The table illustrates that of the 111 respondents a majority of the participants were unmarried, with 78 respondents accounting for 70.3% of the total sample. Married respondents numbered 29, representing 26.1% of the participants. In contrast, only a small proportion of respondents were divorced, totaling 3 individuals or 2.7%, while just 1 respondent (0.9%) was a widow. The cumulative percentages indicate that unmarried and married respondents together constituted 96.4% of the sample.

Occupation					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	Homemaker	2	1.8	1.8	1.8
	Student	62	55.9	55.9	57.7
	Salaried	23	20.7	20.7	78.4
	Self Employed	10	9.0	9.0	87.4
	Professional	12	10.8	10.8	98.2
	Public Employer	2	1.8	1.8	100.0
	Total	**111**	**100.0**	**100.0**	

The table depicts that out of the 111 respondents the majority of respondents were students with 62 individuals accounting for 55.9% of the total sample, indicating that more than half of the participants were engaged in academic pursuits. Salaried employees formed the second-largest group, comprising 23 respondents or 20.7% of the sample. This was followed by professionals, with 12 respondents representing 10.8%, and self-employed individuals, with 10 respondents accounting for 9.0%. A very small proportion of respondents were homemakers and public employers, each consisting of 2 individuals or 1.8% of the total respondents. The cumulative percentages show that students and salaried individuals together made up 78.4% of the sample population.

Residence					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	Rural	41	36.9	36.9	36.9
	Urban	57	51.4	51.4	88.3
	Semi urban	13	11.7	11.7	100.0
	Total	**111**	**100.0**	**100.0**	

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The table shows that out of the 111 respondents, majority of the respondents belonged to urban areas, with 57 individuals accounting for 51.4% of the total sample. Respondents from rural areas constituted the second-largest group, comprising 41 individuals or 36.9% of the participants. In comparison, only 13 respondents, representing 11.7% of the sample, were from semi-urban areas. The cumulative percentages indicate that urban and rural respondents together made up 88.3% of the total population studied.

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Gender	Between Groups	2.309	12	.192	.871	.579
	Within Groups	21.655	98	.221		
	Total	23.964	110			
Age	Between Groups	7.582	12	.632	1.580	.110
	Within Groups	39.193	98	.400		
	Total	46.775	110			
Highest Education	Between Groups	20.813	12	1.734	1.735	.071
	Within Groups	97.961	98	1.000		
	Total	118.775	110			
Marital status	Between Groups	1.139	12	.095	.314	.986
	Within Groups	29.672	98	.303		
	Total	30.811	110			
Per month Income	Between Groups	49.619	12	4.135	1.918	.041
	Within Groups	211.318	98	2.156		
	Total	260.937	110			
Occupation	Between Groups	29.330	12	2.444	2.166	.019
	Within Groups	110.580	98	1.128		
	Total	139.910	110			
Residence	Between Groups	4.834	12	.403	.938	.513
	Within Groups	42.103	98	.430		
	Total	46.937	110			

The ANOVA table examines whether significant differences exist among respondents based on various demographic variables. The results indicate that gender did not show a statistically significant difference among groups, as the significance value was 0.579, which is greater than the standard threshold of 0.05. Similarly, age (Sig. = 0.110), highest education (Sig. = 0.071), marital status (Sig. = 0.986), and residence (Sig. = 0.513) also did not exhibit statistically significant differences, suggesting that these demographic factors had no meaningful impact on the variable under study. However, per month income showed a statistically significant difference, with an F-value of 1.918 and a significance value of 0.041, indicating that income levels significantly influenced respondents' outcomes or perceptions. Likewise, occupation also demonstrated a significant difference among groups, with an F-value of 2.166 and a significance value of 0.019, implying that respondents' occupational status had a meaningful effect on the study variable. Overall, the ANOVA results suggest that among the demographic characteristics considered, only per month income and occupation had a statistically significant association with the dependent variable, while the remaining demographic factors did not show significant differences.

FINDINGS AND CONCLUSION

The findings of the study reveal that most respondents possess awareness regarding electronic vehicles and recognize their environmental and economic benefits. The study further indicates that factors such as monthly income and occupation significantly influence customer perception toward EVs, while variables such as gender, age, marital status, education, and residence do not show significant differences. Concerns related to charging infrastructure, battery performance, and high initial costs remain major challenges affecting consumer adoption.

"The study concludes that customer perception toward electronic vehicles is gradually becoming positive due to increasing environmental consciousness and technological advancements. The findings may help policymakers, automobile manufacturers, and marketers develop effective strategies to promote the adoption and acceptance of electronic vehicles in the market".

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