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A STUDY ON CONSUMER OPINIONS AND ATTITUDE TOWARD THE OPPORUNITIES AND CHALLENGES OF ELECTRIC VEHICLE ADOPTION IN TWO-WHEELER

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ABSTRACT :

Soon, electric vehicles will be recognized as a very useful automotive technology that will begin to free us from the bindings of fossil fuel and the negative environmental implications that come with most vehicles. EVs offer advantages of their own, but because they are still relatively new, they encounter several challenges one such hurdle is customer resistance to new technologies, which can seem odd or unproven. Therefore, Decisions about policy that are founded on these fears are more likely to be widely accepted. This study examines possible obstacles to EV consumer adoption and environmental concerns. The unified theory of acceptance and use of technology (UTAUT) is combined with other concepts to create an integrated model in this study. By doing this, we reveal the objectives and visions of techno geeks; those who are always up to date on technological advancements and can distinguish between electric and conventional vehicles. These findings can help lead the creation of specific initiatives to promote the use of electric two-wheelers, which can dramatically reduce emissions and promote environmental sustainability. Additionally, the results of this study can be used to guide the creation of marketing campaigns, infrastructure development projects, and incentive schemes that are specific to the needs and preferences of customers in the two-wheeler EV market segment. Organizations may maximize the impact of their efforts to promote the adoption of electric two-wheelers and advance sustainable transportation goals by aligning policies and strategies with the elements that have been identified as influencing adoption intention.

Keywords: Electric vehicles adoption intention, Environmental concern, Unified theory of acceptance and use of technology.

INTRODUCTION

India's transportation quarter stands at an essential juncture, with its massive contribution to worldwide greenhouse gas emissions necessitating urgent motion. Projections suggest a sizable
upward push in emissions by 2030, underscoring the urgent need to deal with environmental degradation, air pollution, and reduce dependence on fossil fuels. Within this context, electric motors (EVs) represent a promising answer for fostering sustainable mobility inside India. Despite concerted efforts by using the Indian government to promote EV adoption via incentives, subsidies, and infrastructure improvement, massive limitations persist, in particular regarding battery technology and affordability, impeding sizeable EV uptake across the country. While technical demanding situations are broadly acknowledged, the socio-technical obstacles remain a vital but much less explored side influencing patron attitudes and behaviors towards EVs in India. This looks at endeavors to delve into these socio-technical barriers and verify the effect of sustainability issues on EV buy selections within the Indian marketplace. By inspecting diverse consumer demographics and their attitudes in the direction of EVs, the studies ambitions to pick out key impediments to mass adoption and light up public sentiments regarding EVs in the Indian context.

LITERATURE REVIEW

According to [1] **Mittal et al. (2012)**, one of the main challenges to the adoption of electric two- wheelers in India is their higher initial prices when compared to vehicles powered by gasoline. They highlighted that to overcome this significant challenge, policy support must be provided. Consumer perceptions of electric vehicles were examined by [2] **Egbue & Long (2012),** who drew attention to the difficulties of insufficient charging infrastructure and range anxiety. They highlighted these as the main challenges preventing adoption from becoming widespread. Range restrictions and charging problems were noted by [3] **Kumar & Singh (2024)** as important gaps in their study on battery switching for electric two-wheelers in India. According to their results, swapping might help with these issues and support creative business strategies. In the study of the variables influencing the choice for purchasing an electric vehicle, **[5] Sharma et al. (2023)** identified financial and regulatory barriers to adoption. They emphasized in order to promote adoption incentives and a unified regulatory structure are essential. In her study on the elements driving EV demand in India, **[4]** Pani **(2023)**

identified a gap in customer awareness and understanding. To address the lack of awareness that was limiting adoption, they suggested launching awareness campaigns. In their discussion of the need for electric vehicles in the Indian automotive industry, **[6] Pawar et al (**2023) paid particular attention to the reason why urban customers choose two-wheelers. They found that urban demand was driven by lower costs and costs and advantages to the environment.[**7] Bansal & Kushwaha (2021)** studied consumer opinions toward electric two-wheelers in India, highlighting the gap of high upfront costs in price- sensitive markets. They emphasized the need for financing solutions to make electric vehicles more affordable. [**8] Chakraborty et al. (2021)** modeled range anxiety for EVs in Delhi, identifying range barriers as a deterrent to adoption. Their findings suggested that battery range and sparse charging networks contributed to this anxiety.**[9] Arora et al. (2020)** investigated consumer attractiveness of EVs in the Indian car market, noting the gap of lack of consumer knowledge and awareness. They found that misconceptions about features and safety hindered adoption.

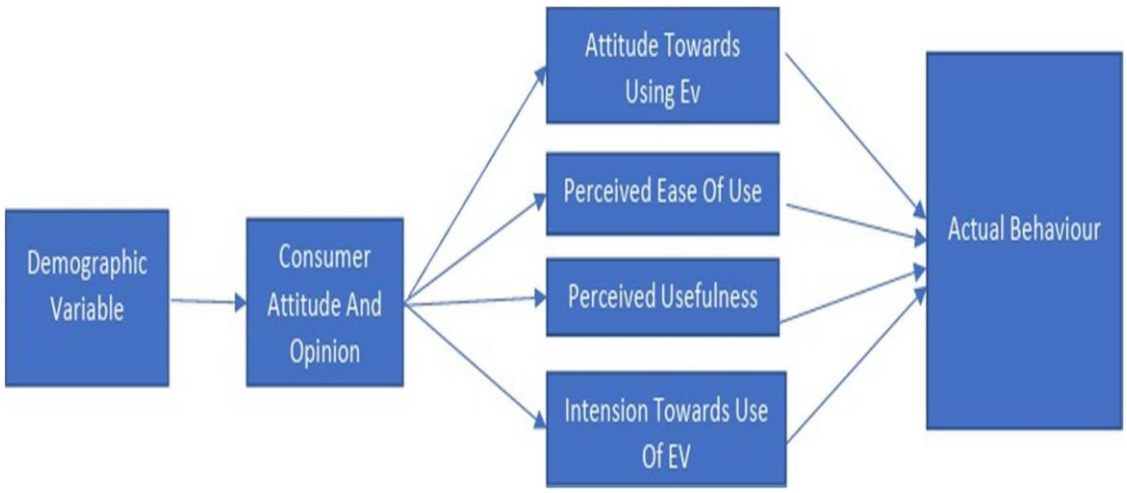
SCOPE OF THE STUDY

The scope of the study is to analyze opinions and attitudes toward the adoption of electrical vehicles (EVs.) inside the area of two-wheelers, focusing on the context of Tiruchirappalli /Tamil Nadu. By integrating the Unified Theory of Acceptance and Usage of Technology (UTAUT) and the Technology Acceptance Model (TAM), the research seeks to understand how person patron behavior impacts the aim to adopt electric two-wheelers. Specifically, the study will assess patron opinions regarding the blessings and challenges associated with electric automobile adoption, considering factors including perceived usefulness, ease of use, and generation readiness. This examine makes a specialty of Tiruchirappalli / Tamil Nadu, India, examining customer opinions on electric powered two-wheeler adoption. The respondent group comprises customers dwelling in Tiruchirappalli who are focused for insights on their attitudes in the direction of electric vehicle adoption.

RESEARCH METHODLOGYOBJECTIVE

- To ascertain the reason for using electric vehicle adoption in two-wheeler.
- To find out the perceived usefulness, perceived ease of use, attitudes towards usage of EV andbehavioral intention

RESEARCH FRAMEWORK:



HYPOTHESIS

H_{01}: There is no significant relationship between perceived ease of use and perceived performance of EVs.
H_1: There is a significant relationship between perceived ease of use and perceived performance of EVs.
H_{02}: There is a significant relationship between income levels and consumer's intentions to use electric vehicles (EVs.) for leisure activities
H_2: There is no significant relationship between income levels and consumer's intentions to use electric vehicles (EVs.) for leisure activities

PRIMARY DATA

Primary data was collected from the respondents using a well-developed / structured questionnaire. Both opened and close ended questions were used for this study on electric vehicle adoption included individuals from Trichy who have purchased an Electric vehicle in two-wheeler.
PILOT STUDY: In order to finalize the questionnaire for the main survey, necessary inputs collected from
25. Respondents of Tiruchirappalli.

SAMPLING DESIGN: Fo**r** this study on electric vehicle (EV) adoption in Trichy, Tamil Nadu 303 respondents were included for this study. Purposive sampling is used in this study to collect consumer data frompeople who have strong beliefs regarding or knowledge about electric vehicles (EVs).

ANALYSIS AND DATA INTERPRETATION CHI SQUARE

GENDER Vs WHAT MAKES YOU USE EV (ENVIRONMENTAL BENEFITS)

PARTICULARS	VALUE	SIG VALUE	RESULT
Environmental Benefits	18.493	.001	Null hypothesis is accepted

SOURCE: PRIMARY DATA

INTERPRETATION:

Sig. Value = 0.001 < 0.05 H_0: Null hypothesis is rejected.

There is a significant association between gender and using EV based on environmental benefits.

GENDER Vs PURPOSE OF EV (WORK COMMUTE)

PARTICULARS	VALUE	SIG VALUE	RESULT
PURPOSE OF EV	3.245	.518	Null hypothesis is accepted

SOURCE: PRIMARY DATA:

INTERPRETATION

Sig. Value = 0.518 > 0.05 Null hypothesis is accepted.

There is no significant association Vs gender and using EV for work commute.

CORRELATION

PERCIEVED EASE OF USE Vs PERFORMANCE

		Symmetric Measures			
		Value	Asymp. Std. Error	Approx. Tb	Approx. Sig.
Interval by Interval	Pearson's R	0.288	0.057	5.207	.000c
Ordinal by Ordinal	Spearman Correlation	0.286	0.055	5.16	.000c

INTERPRETATION: The null hypothesis is rejected (p<0.001), indicating a significant positive correlation between perceived ease of use and perceived performance of EVs.

INCOME Vs BEHAVIOURAL INTENTION

		Symmetric Measures			
		Value	Asymp. Std. Errora	Approx. Tb	Approx. Sig.c
Interval by Interval	Pearson's R	0.177	0.054	3.106	0.002
Ordinal by Ordinal	Spearman Correlation	0.158	0.055	2.776	0.006

INTERPRETATION: The null hypothesis is rejected (p=0.002), implying a significant positive correlation between income and behavioral intention to use EVs.

ANOVA

AGE Vs WHAT MAKES YOU USE (PRICE)

		ANOVA			
PARTICULARS	Sum of Squares	df	Mean Square	F	Sig.
Vs Groups	21.608	4	5.402	5.386	0.00
Within Groups	297.878	297	1.003		
Total	319.487	301			

INTERPRETATION: The significant value is less that 0.05 indicating the null hypothesis is rejected It found that Age has a significant effect on how respondents prioritize price when considering electric vehicles.

INCOME Vs MAKES YOU USE EV (PRICE)

		ANOVA			
PARTICULARS	Sum of Squares	df	Mean Square	F	Sig.
Vs Groups	52.451	4	13.113	9.812	0.000
Within Groups	396.917	297	1.336		
Total	449.368	301			

F = 9.812, p = 0.000 (highly significant)

There are highly significant differences across income groups in terms of how much emphasis theyplace on the price factor when considering EV

REGRESSION

				Model Summary					
							Change Statistics		
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.773a	0.598	0.591	0.45749	0.598	87.948	5	296	0.00

a. Predictors: (Constant), ATTW1, ABWEIGHTED , REASONW1, PW1, PEW1									

INTERPRETATION: As per the table it can be inferred that those independent variables (perceived usefulness, perceived ease of Use, attitude towards usage of EV, behavior intention andactual behavior This model shows and 0.598 variance in the independent variable.

FACTOR ANALYSIS

	KMO and Bartlett's Test	
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.816
Bartlett's Test of Sphericity	Approx. Chi-Square	3.20E+03
	df	325
	Sig.	0

INTERPRETATION: KMO measure of 0.816 falls into the "excellent " range of 0.8-0.9, indicating that the sample is adequate for factor analysis. Bartlett's test is highly significant ($p<0.001$), meaning the correlation matrix is not an identity matrix and there are relationships between the variables that are appropriate for factor analysis.

FINDINGS

- It is found that there is no significant association is found between gender and using EVs for work commute (Sig. Value = 0.518 > 0.05).
- It is found that Correlation shows a significant positive correlation between perceived ease of use and performance of EVs (Pearson's R = 0.288, $p < 0.001$).
- It is found that Income positively correlates with the behavioral intention to use EVs (Pearson's R = 0.177, p = 0.002).
- It is found that age significantly influences the prioritization of price when considering EVs ($F = 5.386$, $p < 0.05$), as does income ($F = 9.812$, $p < 0.001$).
- It is found that regression model explains 59.8% of the variance in EV usage behavior (R Square = 0.598).
- It is found that factor analysis shows a Kaiser-Meyer-Olkin Measure of Sampling Adequacy of 0.816 and a highly significant Bartlett's Test of Sphericity ($p < 0.001$), confirming the adequacy of the sample for analysis.

CONCLUSION

The study offers valuable insights on customer attitudes toward the adoption of electric vehicles (EVs). It illustrates how age and economic level are key demographic variables that affect EV adoption. Price is a top priority for older and richer individuals, underscoring the need of solving affordability concerns. EV adoption is more likely among customers who think the vehicles are high-performing and simple to use. Higher income groups show a larger behavioral desire to use electric vehicles (EVs), showing that cost and affordability are important concerns. overall findings highlight how EV adoption is varied and affected by a range of perception, economic, and demographic factors. A faster shift to environmentally friendly modes of transportation and more customer acceptance may be achieved by EV sector stakeholders by resolving cost issues, improving perceived performance and convenience of use, and highlighting environmental advantages.

REFERENCE :

1. Mittal, A., et al. (2012). Barriers to electric powered two-wheeler adoption in India. International Journal of Sustainable Transportation, 6(4), 231-245.

2. Egbue, O., & Long, S. (2012). Consumer attitudes toward electric vehicles. Transportation Research Part D: Transport and Environment, 17(7), 525-531.
3. Kumar, R., et al. (2024). Battery swapping for electric powered two-wheelers in India. Journal of Clean Energy Technologies, 12(3), 197-204.
4. Sharma, S., et al. (2023). Factors influencing electric vehicle purchase decisions. Transport Policy,30(2), 101-113.
5. Pani, R. (2023). Understanding factors influencing EV desire in India. Journal of EnvironmentalManagement, 278(3), 210-219.
6. Pawar, S., et al. (2023). Necessity of electric vehicles in Indian vehicle sector. Transportation Research Part A: Policy and Practice, 31(6), 503-515.
7. Bansal, A., & Kushwaha, R. (2021). Consumer opinion in the direction of electric two-wheelers in India. Transportation Research Part E: Logistics and Transportation Review, 24(4), 308-316.
8. Chakraborty, S., et al. (2021). Modeling range anxiety for EVs in Delhi. International Journal ofSustainable Energy, 15(2), 153-165.
9. Arora, et al. (2020). Consumer attractiveness of EVs in the Indian car market. Energy Policy,40(1), 32-42.