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EXPLORING THE INFLUENCE OF CONSUMER PERCEPTION AND ATTITUDES ON THE PURCHASE INTENTIONS OF ELECTRIC VEHICLES IN INDIA

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Abstract

The main objective of this study is to examine consumer opinion and purchasing Intentions regarding electric automobiles in India. In response to environmental challenges, the Indian Government is implementing favorable policies to promote electric car sales, enabling the nation to achieve the UN climate objectives of reducing greenhouse gas emissions. Moreover, India ranks among the largest automotive markets globally, and the electric car sector exhibits significant growth potential. This research employs a quantitative methodology and questionnaires to investigate the problem statement. This research empirically examines the factors influencing consumers' propensity to acquire electric vehicles and their perceptions about electric vehicles in India. It offers insights for electric car producers and the Government regarding consumer expectations for electric vehicles in India.

Keywords: Electric Vehicles; Environment; Drive Range; Value For Money; Infrastructure; Consumer Awareness; Perception.

INTRODUCTION

In the global automotive market, battery electric vehicles (BEVs) are regarded as innovative Alternatives to gasoline-powered automobiles, resulting in a surge in battery electric vehicle (BEV) sales across numerous countries. Between 2005 and 2020, worldwide sales of new Battery Electric Vehicles (BEVs) rose from 1,890 to 2.1 million units in 2019 (Virta Global, 2021). Consistent with this global trend, sales of BEVs in India have surged significantly. Since 2010, when battery electric vehicles (BEVs) were initially launched with 600 units, the sales of new BEVs have escalated to

Approximately 156,000 automobiles in 2019. In 2019, the market share of BEVs in India was 0.7%, indicating that BEVs had not yet successfully infiltrated the Indian vehicle market, in contrast to their market penetration in other nations. Compared to traditional gasoline vehicles, battery electric vehicles (BEVs) generate no pollutants, exhibit diminished noise during operation and incur lower running expenses. Notwithstanding their elevated vehicle cost, reduced driving range, and extended charging duration, BEVs exhibit significant promise as novel transportation choices.

Contemporary environmental issues are driving the production and distribution of electric automobiles. It serves as a motivating factor for the nation to fulfill the Paris Climate Agreement (UNFCC). The year 2018 transformed the Indian manufacturer's perception of electric vehicles as the superior alternatives to fuel-powered cars. The combination of India's skilled and semi-skilled workforce, a substantial customer base, and comparatively lower production and labor costs has attracted nearly all global electric vehicle manufacturers and component suppliers to establish operations in India, stimulating infrastructural development. Thus, examining the determinants that affect customers' Intention to adopt BEVs is essential for formulating effective regulations promoting BEV sales.

It is essential to examine the determinants influencing consumer adoption of these cars. Numerous

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elements affecting automobile consumers' purchasing decisions include the regulatory environment, individual psychological aspects such as attitude and perception, financial considerations, social acceptance, and levels of trust. While several empirical studies exist on customer acceptability of hybrid vehicles, there is a paucity of research addressing fully electric vehicles' perceptions and purchasing intentions. From an environmental standpoint, climate change, elevated CO2 emissions, and the depletion of fossil fuel supplies render adopting electric vehicles a precautionary measure and a safeguard for the future.

BACKGROUND OF THE STUDY:

The Indian automotive industry has experienced substantial expansion during the last few decades. With a population surpassing 1.4 billion, India offers a distinctive market that draws domestic and international vehicle manufacturers. The market is anticipated to expand consistently, propelled by increasing disposable incomes, heightened urbanization, and evolving lifestyles. India's automobile industry ranks among the largest globally, with millions of automobiles sold yearly, significantly contributing to the international automotive sector. Consumer purchasing behavior is a crucial element in comprehending the dynamics of the automotive industry. In India, automobile purchasing decisions are influenced by various factors, including socio-economic conditions, cultural perspectives, and psychological influences. The swift evolution of India's economy has led to a heightened demand for automobiles, particularly in metropolitan regions.

Nonetheless, customer behavior in the Indian vehicle business is considerably more intricate than financial capacity. Consumers are more aware of technical innovations, environmental consequences, fuel efficiency, and brand equity, which affect their buying choices. The Indian market exhibits a variety of consumer segments with differing preferences. Tech-savvy youth are more predisposed to electric vehicles (EVs) or hybrids, whereas the middle-aged, family-oriented demographic favors SUVs or sedans that provide comfort and room. In rural regions, practicality, cost, and fuel efficiency are paramount, contrasting with the increasing metropolitan inclination towards advanced features and environmental sustainability.

Moreover, the impact of social media, advertising, and word-of-mouth significantly shapes consumer perceptions of various automobile manufacturers. The advent of electric cars (EVs) in India signifies a new era in consumer decision-making. Customers progressively evaluate sustainable alternatives as environmental consciousness rises and government programs promote electric vehicle use. This transition, however, presents hurdles, as consumers remain reluctant due to issues such as charging infrastructure, battery longevity, and elevated initial expenses. Comprehending the influence of these aspects on consumer behavior is essential for manufacturers to address the requirements of contemporary Indian vehicle purchasers adequately.

In addition to economic factors, social influences, including peer pressure and familial input, significantly impact automobile purchase decisions. In a collectivist country such as India, the perspectives of family and friends frequently influence the decision-making process, whether on the type of vehicle or the brand selection. This differs from individualistic civilizations, where personal preference may have an immediate impact. Psychological elements influence consumer evaluations of car models and features, including motivation, perception, and attitudes. The need for status and social acknowledgment frequently motivates acquisitions in premium categories, whereas the necessity for functionality and usability dictates selections in the budget category. Consumer perceptions of innovation and novelty affect their propensity for new models and designs, with numerous purchasers prepared to pay a premium for the most recent technical advancements. Alongside these personal and cultural aspects, external elements such as governmental legislation, gasoline costs, and economic situations also affect automobile purchasing. Government subsidies, taxation, and laws concerning

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environmental standards, particularly for electric vehicles, directly influence consumer choices. The Indian Government's promotion of electric mobility, exemplified by incentives such as diminished GST on electric vehicles and the FAME (Faster Adoption and Manufacturing of Hybrid and Electric Vehicles) plan, has begun to affect purchase patterns.

Furthermore, the emergence of online platforms has transformed consumer interaction with vehicle businesses. Digital marketing, online automobile evaluations, virtual test drives, and social media platforms have become crucial for influencing consumer attitudes. The ability to perform comprehensive research before a purchase has made consumers more knowledgeable, resulting in more astute buying choices. The transition to digitalization is especially evident among younger consumers, who predominantly depend on Internet resources for information before visiting a dealership. The Indian automobile sector is experiencing a transition influenced by multiple internal and external factors. As customer tastes change and new technologies arise, comprehending the theoretical principles of consumer behavior is essential. Manufacturers and marketers must remain cognisant of these changes to effectively connect their strategies and products with the requirements of the contemporary Indian consumer. This study will explore the theoretical frameworks elucidating consumer purchasing behavior in the Indian automobile market, analyzing the applicability of these theories within India's distinct cultural, social, and economic contexts. The findings of this study aim to assist automotive manufacturers, marketers, and legislators in formulating more successful methods that appeal to Indian consumers. Highlight the increasing significance of the automobile industry in India and its recent evolution. Emphasize the importance of customer behavior in influencing industry trends, particularly regarding purchasing decisions.

STATEMENT OF THE PROBLEM

The transport sector is the largest consumer of oil in India. India's reliance on imports for about three-fourths of its oil demand poses significant implications for national energy security. Due to substantial oil dependency, The transport sector accounts for approximately 10% of CO2 emissions and is a considerable source of air pollutants. The study examines the effects of many co-benefits of electric vehicles, as reduced CO2 emissions mitigate air pollution, while social acceptance and consumer faith in the technology and existing infrastructure affect consumers' purchasing intentions. Aside from the co-benefits, electric vehicles may incur co-expenses and pose risks, mainly due to the substantial demand for batteries. This article examines the significance of electric cars in consumer perceptions regarding environmental sustainability.

SCOPE OF THE STUDY

The research examines consumer perceptions and purchasing intentions regarding electric automobiles in India. Numerous studies have investigated the technology, advantages, environmental effects, and societal acceptance of electric vehicles. This study examines literature and survey data from vehicle owners to address the public's lack of knowledge regarding electric vehicles (EVs). Additionally, it elucidates buyers' expectations concerning these vehicles. To mitigate the issues of air pollution and environmental hazards to the greatest extent while utilizing electric vehicles.

NEED AND IMPORTANCE OF THE RESEARCH

The study aims to comprehend consumer perceptions and buying intentions regarding electric automobiles in India. The study's significance lies in the substantial effects electric vehicles (EVs) can have on the environment, national economy, power infrastructure, and other industries. Electric vehicles (EVs) have the potential to significantly diminish greenhouse gas emissions from the transportation industry, yielding substantial environmental advantages. Nonetheless, significant challenges must be addressed for electric vehicles to supplant traditional internal combustion engine automobiles. This

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study aims to analyze all pertinent data about consumers, technology, charging methods, impacts, trends, and potential future advancements. The purpose is to present a comprehensive overview of current consumer trends and expectations about EV technology and projected development pathways to aid subsequent studies in this industry.

REVIEW OF LITERATURE

This study employed a structured questionnaire to collect primary data from respondents across various demographic profiles in India. A purposive sampling technique was used to target individuals with potential interest in electric vehicles. Data analysis included descriptive statistics and inferential methods to explore consumer perceptions, attitudes, and their influence on purchase intentions. Studies on consumer perception and attitudes indicate that environmental consciousness, economic advantages, and technological progress substantially affect intentions to purchase electric vehicles. The research underscores the influence of demographic factors and previous experiences on consumer preferences. Nonetheless, insufficient awareness and infrastructural obstacles persist as significant impediments in India.

Electric automobile

Electric vehicles emerged in the mid-19th century when electric power was a favored method for motor vehicle propulsion. They offered comfort and operational convenience unattainable by contemporary fuel-powered cars. The internal combustion engine (ICE) remains the dominant propulsion system for motor vehicles, although electric power is prevalent in several other vehcle categories, including trains and smaller vehicles.

Electric vehicles depend entirely on the energy stored in their battery packs; thus, the driving range of these vehicles is directly correlated with battery capacity. The battery ranges depend on vehicle configurations, driving and style, road conditions, climate, battery type, and age. When depleted, recharging the battery pack requires significantly more time than refilling a traditional internal combustion engine car. The charging duration depends on the operational power level, charger arrangement, and infrastructure. The benefits of electric vehicles include their straightforward design, functionality, and ease of use. These generate no noise and emit no greenhouse gases (GHG), thus advantageous to the environment.

The potential of electric vehicles has been examined in several studies from technical (Werther, Frischknecht, Labeye, Kley et al.), environmental (Sourkounis et al.), consumer attitude (Roger Bennett), and purchase intention (Kenan Degirmenci) perspectives. The researchers indicated a significant challenge for electric vehicles in establishing suitable markets, particularly regarding public perception and acceptance of electric cars in India. The transition from acceptance of gasoline vehicles to electric vehicles necessitates extensive promotion and the establishment of confidence within the electric vehicle sector. Nevertheless, significant resistance remains to the uptake of electric vehicles (Hoffmann).

Electric vehicle industry

Electric vehicles existed before 1918 but primarily diminished with the advent of gasoline-powered internal combustion engine vehicles. These are fuel-powered vehicles. Place the need for electric vehicle manufacturing into a dormant state. However, 2017 has renewed the demand, emphasizing the development of electric vehicles for extended-distance travel and the Government's enhancement of car maintenance support systems. The perception and adoption of technology encompass two elements: the characteristics of the technology itself and the adopter's profile. The management perspective can be elucidated through "the innovation diffusion theory (IDT) (Rogers, 1962) and its developments, including the TOE (Technology-Organization-Environment) framework, Tornatzky and Fleischer,

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1990). These factors pertain to adopting new technology, including performance expectancy, effort expectancy, social influence, and conducive conditions (Venkatesh and Davis; Venkatesh et al.). These factors are essential for the adoption of Electric Vehicles.
The commercial vehicle sector is anticipated to be the most rapidly expanding market within the electric vehicle industry. India and China significantly contribute to developing the electric commercial sector, particularly through the rising adoption of electric buses. Numerous countries are anticipated to substitute their fuel-powered bus fleets with electric buses. The ongoing transition from fossil fuel-powered public transport to electric buses will propel the expansion of electric commercial vehicles. The advancement of e-commerce, logistics, and shared mobility has propelled the expansion of electric commercial vehicles over the forecast period.
The electric car market is now dominated by prominent worldwide entities such as Tesla (US), BYD (China), BMW (Germany), Volkswagen (Germany), and Nissan (Japan). These companies primarily concentrate on product development, implementation expansion plans, and engagement in collaborations, partnerships, and mergers and acquisitions to enhance their presence in the rapidly growing electric vehicle market. The Asia Pacific market is anticipated to experience the most rapid expansion, succeeded by Europe and North America. Certain countries' automotive industries are orientated toward innovation, technology, and the advancement of sophisticated electric vehicles, particularly in China, Japan, and South Korea.

Awareness about the EV for Consumers

As a relatively new technology that has only begun to become a mainstream product, it is essential to understand the levels of awareness consumers have towards HEVs and PEVs and, more importantly, what aspects affect consumer decisions. To understand and gain some insight into green marketing, the research study from Lan et al. drives directly on HEV and PEV awareness. Using a microeconomic approach, Zhang et al. analyzed consumer awareness of EVs and examined the factors affecting consumers' choices in China. The study uses survey data collected from 299 respondents in the Nanjing, China region. Zhang et al. (2011) utilize three binary regression models to determine the factors that contribute to the acceptance of EVs, purchase time frame, and purchase price. Additional factors that influence purchasing and price acceptance are academic degree, age, annual income, the number of family members, maintenance cost, and the opinion of peers. The findings from this study set the criteria for consumers in China separately and what motivates their purchasing behavior of EVs. Many studies and findings suggest that a high environmental awareness positively affects using more environmentally friendly transport modes (Kumagai and Managi; Xu et al., 2020; Zhou et al.).
Many studies have found a general lack of knowledge and awareness about electric vehicles among consumers. For example, less than 50% of US consumers can name a specific plug-in electric vehicle make and model (Singer), and less than 35% of California consumers are aware of incentives and subsidies available for the purchase of electric cars (Kurani [16] & Tal, 2014). In a survey that happened within
In US cities (Krause), about two-thirds of the respondents had a wrong understanding of the essential characteristics of plug-in electric vehicles, and about 95% were unaware of available incentives. An IBM consumer survey (Gyimesi & Viswanathan, 2011) closely found that 45% of the surveyed drivers had little to no understanding of electric vehicles. Consumers exposed to electric vehicles are highly aware of their usefulness and consider the mice for future purchases (Kurani et al., 2016; Larson, 2014; Gyimesi & Viswanathan, 2011).

Environmental impact of electric vehicle

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Electric vehicles have the potential for notable contributions towards achieving the UN's climate protection goals in the transport sector. However, it is still unknown what the environmental impacts of the large-scale introduction of electric vehicles will be. Many countries have taken this primary goal and responsibility towards the environment and sustainable development. This project has developed scenarios for the increased dissemination of electric vehicles in the market until 2050 and formulated policy recommendations from these findings.

When an electric vehicle runs on electricity, it emits no tailpipe emissions. EVs are a lot more eco-friendly than conventional gasoline-powered vehicles today when the assessment is based on that factor alone. However, when evaluating the eco-friendliness of an electric vehicle, one needs to consider the "well-to-wheel" emissions. This comprehensive term considers greenhouse gas and air pollutants emitted during the act to produce and distribute the energy to power the car. Electricity production leads to varying amounts of emissions depending on the resource. While "being green" when driving an electric vehicle is a start, if the supreme goal in purchasing an electric vehicle is to reduce greenhouse gas and polluting emissions, we should prioritize using zero-emissions electricity wherever possible. Rezvani et al. (2021). the study identifies that consumers with a higher perception of the environmental impacts of EVs have a higher choice probability. Natural gas provides the majority of electricity, followed closely by coal. It is often considered the "cleanest" fossil fuel because it emits 50 to 60 % less carbon dioxide than coal. Coal is the primary source of around 65 %of carbon dioxide emissions in the electric power sector. Suppose the primary motive in purchasing an electric vehicle is to be green. In that case, they should consider powering the car with a renewable energy source that can be generated at the consumer's home (such as solar, wind, or geothermal).

Consumer Acceptance of EV Technology

The distinction of environmental entrepreneurship is the focus on acting in society's economic and ecological needs, thereby emphasizing a 'double bottom line' of fusing sustainable objectives and profit-driven models (Belz & Binder). Technological innovation has recently been capitalized upon to improve the natural environment (Walsh). In this space, stakeholders act under the pretense that successful market potential to support and foster innovation requires knowledge and sophistication for consumers to adequately recognize the value proposition of the explored product or service. Therefore, user perception and market acceptance are interrelated items that can dictate future policy and action direction. A renewable energy technology (RET) commercialization environment framework highlights market-pull (the eco-sophistication of the market) and technology-push (demand for renewable energy technology products) forces to determine more appropriate choice commercialization strategies based on the nature of the market.

The literature surrounding innovation implies that individuals who embody certain descriptive characteristics will adopt innovations before their peers. Such characteristics include the perception of the individual adopters, communication channels, time scale, and social systems of influence (Rogers, 2003). Rogers modeled the diffusion of innovation theory, which suggests that members of a given society will fall into one of five predetermined adopter groups based on their willingness to accept new technology.

Rogers' (2003) findings suggest that of the five adopter groups, distinct marketing tactics are necessary to captivate and persuade potential consumers to adopt an innovative product or service. The degree of support generated from the initial 'innovators' and 'early adopters' dictates a predictive pathway to understanding the rate at which adoption amongst the 'early majority, 'late majority, and 'laggard' groups may occur. With the Intention of better understanding EV marketing modeling, Peters and Dütschke applied preceding theories on user adoption trends towards innovation to query consumers' Intention to

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purchase and use an EV. For the study, he adapted the variables from Rogers' (2003) work on the diffusion of innovation theory. However, there was a decision to substitute the 'complexity' variable with the 'ease of use' for a more positive construct specification. For this research, the variables will not be interchanged since the intent is to maintain a neutral stance. According to the Intention to purchase and use an electric vehicle model (Peters & Dütschke, 2014), six variables significantly impact the Intention to buy and use an EV.

OBJECTIVE AND INTENTION TO PURCHASE AND USE AN ELECTRIC VEHICLE MODEL

1. To analyze the factors influencing the purchase intention of electric vehicles:
2. To evaluate the demographic and psychographic characteristics of potential electric vehicle consumers in India.
3. To identify barriers and opportunities for the adoption of electric vehicles in India.

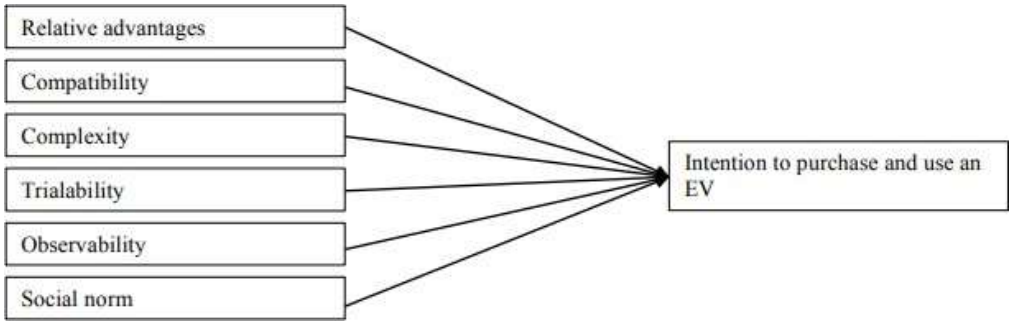

Fig. 1(b). Intention to purchase and use an electric vehicle model (Peters & Dütschke [22], 2014)

RESEARCH METHODOLOGY

The structural model delineates the interrelations among the many variables in the study, illustrating their linkages.

Research Design

The study aims to ascertain consumer perception and purchase intention regarding electric vehicles in India and explore potential recommendations for enhancement and practices within the electric vehicle sector. A descriptive research design has been utilized for this investigation.

Demographics

The survey population will consist of individuals over 18 in India, as only this demographic typically possesses a vehicle and plays a substantial role in purchasing decisions regarding valuable assets such as vehicles. Reaching the entire population is challenging and infeasible due to the ongoing COVID-19 pandemic.

Sample method

The survey employs purposive sampling, targeting a sample size of 144 respondents. This technique is selected due to time limitations and aims to ensure a balanced demographic distribution. The sample encompasses a proportionate representation of male and female consumers. Various age groups above 18 are participating in this study, contributing data regarding the knowledge and purchasing intentions of electric vehicles in India. This data collection method is conducted to achieve the study's objectives.

Methods of Data collection

The primary data collection process is conducted using structured survey questionnaires. The questionnaire was designed to obtain relevant information regarding consumer perceptions, positive attitudes toward electric vehicles, and purchasing intentions. It comprises 27 closed-ended questions, informed by prior research and analogous studies contributing to the secondary data.

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DATA ANALYSIS AND INTERPRETATION

A total of 144 responses have been considered for analysis, reflecting various factors influencing consumer purchase intentions in India. This data is interpreted to test the hypothesis and derive meaningful inferences. The inferential analysis is employed to generalize or hypothesize about "What happened?" by comparing statistics from different groups within the population. The primary objective of the data analysis is to conduct statistical tests, such as the Chi-square test, to examine differences between categorical variables within the same population and the correlation coefficient test to assess relationships between continuous variables. The data analysis tool utilized is SPSS software.

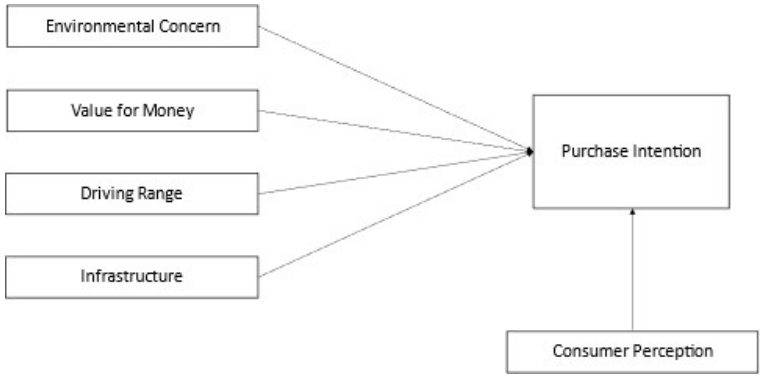

Figure 2. **Conceptual Model**

Table 1: Demographic Profile

: **Demographic Variable**	**Particular**	**No. of Respondents**	**Percentage**
Gender	Female	42	29%
	Male	102	71%
Age	18-25	12	8%
	26-35	33	23%
	36-45	69	48%
	46-55	25	17%
	>55	5	3%
Highest Qualification	SSLC	0	0%
	+2	1	1%
	Diploma	17	12%
	U.G	67	47%
	P.G	49	34%
	Doctoral Degree	10	7%
Monthly Income	Less than ₹15,000	5	3%
	₹15,000 to ₹50,000	17	12%
	Above ₹50,000	37	26%
	Prefer not to	85	59%

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	answer		
Experience with Electric Vehicles	No	127	88%
	Yes	17	12%
	Total	144	100%

*** **Source:** Primary data

The sample is predominantly male, with 71% of respondents identifying as male and 29% female. No respondents identified as "Other," indicating limited gender diversity. A significant proportion of respondents (48%) are in the 36-45 age group, highlighting a strong representation of middle-aged individuals. Younger (18-25) and older respondents (>55) are underrepresented, at 8% and 3%, respectively, suggesting a potential gap in interest or accessibility for these age groups. The educational profile indicates that most respondents are well-educated, with nearly half (47%) holding an undergraduate degree and 34% having postgraduate qualifications. This reflects a sample with significant academic exposure, potentially influencing their perceptions and attitudes toward electric vehicles.

The high percentage of respondents (59%) choosing not to disclose their income limits detailed analysis. However, among those who did, a notable 26% reported earning over ₹50,000 per month, suggesting that affordability could play a role in purchase intentions. Limited familiarity with electric vehicles is evident, as 88% of respondents have no prior experience. This indicates a significant opportunity to enhance awareness and accessibility in the market. This demographic analysis highlights a well-educated, middle-aged, and predominantly male sample with limited exposure to electric vehicles. These factors are crucial in understanding consumer perception and attitudes and developing strategies to enhance purchase intentions in the Indian electric vehicle market. The vehicle purchase experience reveals that feedback regarding electric vehicles remains limited, with only 17 individuals responding affirmatively. This indicates that the electric vehicle market still possesses significant development opportunities, suggesting a potentially optimistic outlook.

Analyzing the Influence of Environmental Concerns on Electric Vehicle Purchases

Hypothesis 1: Environmental concerns of the people can positively influence their Intention to purchase Electric Vehicles.

Ho - There is no positive influence on EVs' purchase intention due to people's Environmental concern s.

HA—People's environmental concerns positively influence their purchase intention of EVs.

Table .2: Correlation – Hypothesis 1

Correlations

		Environmental Crn	Purchase Intention
Environmental Concern	Pearson Correlation	1	.173*

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	Sig. (2-tailed)		.039
	N	144	144
Purchase Intention	Pearson Correlation	.173*	1
	Sig. (2-tailed)	.039	
	N	144	144

*. Correlation is significant at the 0.05 level (2-tailed).

By running Pearson's correlation to determine the relationship between 144 values of both variables, the significance level (0.039) is less than 0.05; the test is statistically significant and indicates strong evidence to reject the null hypothesis. This means here, in this case, we accept the alternative hypothesis. The null hypothesis is rejected, and there is a positive correlation between the environmental concern and the purchase intention of electric vehicles in India. However, the correlation value is weak. (r = .173, n = 144, p < .05). Among all other factors, as per the study, the influence of environmental concern has a positive impact on the purchase intention of Indian consumers.

Analyzing the Positive Influence of Electric Vehicle's Value For Money Factor On Purchase Intention

Hypothesis test 2 - There exists a relationship between the "Value for money" and the purchase intention of an Electric Vehicle.

Ho—There is no relationship between "Value for money" and purchase intention for an Electric Vehicle.

HA—There is a relationship between "Value for money" and purchase intention for Electric Vehicles.

A Pearson's correlation was run to determine the relationship between 144 values of the value for money variable and purchase intention dependent variable. As the significance level (0.001) is lesser than 0.05, the test is statistically significant and indicates strong evidence to reject the null hypothesis. This means we accept the alternate hypothesis and reject the null hypothesis. The statistical test provides an inference that there is a correlation between the value for money factor and the purchase intention of electric vehicles in India. (r = .269, n= 144, p < .01).

Table. 3: Correlation – Hypothesis 2

Correlations

		Willingness	Value for Money
Willingness	Pearson Correlation	1	.269**
	Sig. (2-tailed)		.001
	N	144	144
Value for Money	Pearson Correlation	.269**	1
	Sig. (2-tailed)	.001	
	N	144	144

**. Correlation is significant at the 0.01 level (2-tailed).

Financial factors are always important for consumers when buying a new vehicle. The consumer will consider the price factors like initial cost, benefit during maintenance, and cost incurred to recharge the batteries. If the vehicle cost goes down, the Intention to purchase the decision will increase further. Here, it is the responsibility of the electric vehicle producers to produce low-cost vehicles by minimizing

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various variable costs.

Analyzing the influence of the Driving range of electric vehicles on the purchase decision

Hypothesis test 3 – The driving range of an electric vehicle can impact consumers' purchase decisions.

Ho – The Driving Range of the electric vehicle does not impact the purchase decision.

HA – The driving range of the electric vehicle impacts the purchase decision.

A Pearson's correlation was run to determine the relationship between 144 values of both variables. As the significance level (0.0003) is less than 0.05, the test is statistically significant, the null hypothesis is rejected, and there exists a correlation between the driving range of electric vehicles and consumer's Purchase Intention, and the correlation is weak (r = .295, n = 144, p < .01). Regarding Indian consumers, the driving range is a primary pull factor that is a barrier when considering buying an electric vehicle. In the market, it is also known as 'range anxiety,' which is most concerning to consumers.

Analyzing the influence of infrastructure over the purchase intention of electric vehicle

Hypothesis test 4 – A well-established infrastructure will have significant control over the purchase intention of an electric vehicle.

Ho – There is no significant infrastructure control over the purchase intention of an electric vehicle.

HA – Significant infrastructure control is over the purchase intention of an electric vehicle.

A Pearson's correlation was run to determine the relationship between 144 values of both infrastructure variables and purchase intention. As the significance level (0.0004) is less than 0.05, the test is statistically significant, the null hypothesis is rejected, and there exists a correlation between the supporting infrastructure and the consumer's Purchase Intention; even though the correlation is positive, it is a weak one (r =.291, n = 144, p < .01).

Analyzing the impact of consumer perception of electric vehicles on their purchase

Hypothesis test 5 – There exists a statistically significant relationship between consumer perception and buying intention of electric vehicle

Ho – There is no significant relationship between consumer perception and buying intention of electric vehicles.

HA – There is a significant relationship between consumer perception and buying intention of electric vehicles.

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Table .4: Correlation - Hypothesis 3

Correlations

		Willingness	Drive Range
Willingness	Pearson Correlation	1	.295**
	Sig. (2-tailed)		.000325
	N	144	144
Drive Range	Pearson Correlation	.295**	1
	Sig. (2-tailed)	.000325	
	N	144	144

**. Correlation is significant at the 0.01 level (2-tailed).

Table .5: Correlation – Hypothesis 4

Correlations

		Willingness	Infrastructure
Willingness	Pearson Correlation	1	.291**
	Sig. (2-tailed)		.000411
	N	144	144
Infrastructure	Pearson Correlation	.291**	1
	Sig. (2-tailed)	.000411	
	N	144	144

A chi-square analysis was conducted to identify the significance of the relationship.
The Chi-square test was conducted to determine the relationship between consumer perception and the willingness to adopt electric vehicles. From the 144 values of perception about the factors affecting electric cars in India, the significance level obtained (0.0002) is less than 0.05. The test is statistically significant, the null hypothesis is rejected, and there exists a significant relationship between consumer perception and the buying intention of the electric vehicle.

The results demonstrate that Indian consumers' awareness positively affects their willingness to consume electric vehicles. This aligns with prior studies focusing on the impact of awareness about adopting electric cars. The findings here suggest a personal belief that individual environmental awareness motivates people to adopt electric vehicles. More precisely, Indian people who believe in ecological awareness are more likely to be potential consumers of electric cars.

Table 6. Chi-Square test – Hypothesis 5

Awareness * Willingness Crosstabulation

Willingness		Total

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No				Yes	Total
Awareness	Yes	Count	5	120	125
		Expected Count	8.7	116.3	125.0
	No	Count	4	7	11
		Expected Count	.8	10.2	11.0
	May be	Count	1	7	8
		Expected Count	.6	7.4	8.0
Total		Count	10	134	144
		Expected Count	10.0	134.0	144.0

Willingness

Chi-Square Test

a. 2 cells (33.3%) have an expected count of less than 5. The minimum expected count is 0.56

	Value	df	Asymptotic significance (2-sided)
Pearson Chi-Square	16.792[a]	2	.000226
Likelihood Ratio	10.199	2	.006
Linear-by-Linear Association	6.892	1	.009
N of Valid Cases	144		

FINDINGS

- The statistical test indicates a correlation between awareness levels and the purchase intention of electric vehicles in India. Increased awareness fosters a positive perception of electric cars, influencing the inclination to acquire them.
- The collected data indicates that consumer awareness regarding electric vehicles varies; over 70% recognize their environmental advantages and governmental initiatives for a sustainable environment, while fewer than 50% are informed about the necessary infrastructure and technology associated with EVs. In summary, consumers are cognisant of the environmental benefits and government efforts, yet many lack knowledge about electric vehicles' technology, features, and infrastructure requirements.
- The correlation coefficient test has demonstrated that environmental concern, value for money, driving range, and infrastructure positively influence consumers' purchase decisions.
- Insufficient charging infrastructure (CI) is a significant obstacle to the successful implementation of electric car initiatives by the Government of India; over 90% of survey respondents indicated that "the infrastructure for electric vehicles must expand in the country."
- Another critical component consumers evaluate is the driving range, sometimes referred to as 'range anxiety' in the market, which is a significant concern for them. Over 60% indicate that current electric vehicles do not fulfill their range expectations, and 66% assert that the

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- The driving range asserted by the manufacturers is unreliable.
- The collected data indicates that price range, confidence in that range, and charging infrastructure are significant obstacles to EV adoption. Indian consumers exhibit considerable price sensitivity, with the cost of an EV being nearly three times that of a comparable internal combustion engine vehicle, presenting a substantial barrier.
- Recharging electric vehicles requires a considerable time commitment. Insufficient charging infrastructure and slow-charging batteries deter consumers from adopting electric cars. According to an official report from the Bureau of Energy Efficiency, Ministry of Power, and Government of India, there are only over 750 charging stations nationwide.
- In the Indian market, customers exhibit confidence in technology; nevertheless, this trust is deficient regarding electric vehicles, which have yet to mature. Trust is critical, as Indian consumers allocate their expenditures solely to areas they deem trustworthy.
- The driving range requires significant development and enhancement since the limited range of electric vehicles fails to satisfy the needs of users seeking to go long distances.
- According to the survey data, over 60% of respondents intend to purchase an electric vehicle within the next decade, indicating a significant anticipated shift towards EVs. The annual electricity demand is projected to rise, presenting a considerable challenge to meet this requirement. To substantially reduce CO2 emissions, the Government must prioritize electricity generation from natural resources to charge EV batteries.
- The rising popularity of electric vehicles results in increased battery use, which, if not managed appropriately, could potentially cause environmental harm. Disposed batteries contribute to water and air pollution, adversely impacting human health.
- The paper indicates that India lacks adequate stock of essential raw materials such as lithium and cobalt, necessitating reliance on foreign sources. The advancement of the battery sector, the establishment of charging infrastructure, and the development of local supply chains are vital for adopting electric vehicles (EVs).

CONCLUSION

Electric vehicle manufacturers and the Government of India must enhance investment in fostering social acceptance of electric vehicles by developing additional infrastructure, high-capacity batteries, and advancing technology to instill consumer confidence. The analysis indicates that the populace is cognisant of the environmental advantages. Since ecological sustainability is a paramount concern, electric vehicles can significantly contribute to this goal, as their carbon emissions are nearly 90% lower than traditional cars. In addition to manufacturers, the Government should intensify efforts to promote awareness of electric vehicles and cultivate favorable perceptions among prospective consumers. Regardless of demographics, government incentives for electric vehicle purchases have achieved limited recognition among potential consumers. Individuals believe the price and maintenance costs are comparatively elevated relative to other factors. Even those inclined to purchase electric vehicles acknowledge their high cost but recognize that EVs significantly reduce environmental pollution and enhance social acceptance. Consequently, they favor electric cars. Additionally, charging infrastructure and driving range are perceived as inadequate, while recharging time is considered excessive. Despite areas needing improvement for the proliferation of EVs in India, over 50% of respondents plan to acquire an electric vehicle shortly.

REFERENCES

ISSN:1624-1940
http://magellanes.com/

1. Axsen J, TyreeHageman J, Lentz A. Lifestyle practices and pro-environmental technology. Ecological Economics. 2012; 82:64-74.
2. Belz FM, Binder JK. Sustainable Entrepreneurship: A Convergent Process Model. Bus. Strategy. Environment. 2017; 26:1–17.
3. Frischknecht R, Flury K. Life cycle assessment of electric mobility: Answers and challenges. International Journal of Life Cycle Assessment. 2011;16:691–695.
4. Gyimesi K, Viswanathan R. The shift to electric vehicles: Putting consumers in the driver's seat; 2011.
5. Hoffmann C, Hinkeldein D, Graff A, Kramer S. What Do Potential Users ThinkAbout Electric Mobility? In: Evolutionary Paths towards the Mobility Patterns of the future. Springer, Heidelberg. 2014;85–99.
6. Jai Wang, Wei Zhou. Factors Influencing the Purchase Willingness towards Electric Vehicles in China. Thesis, Business Studies. 2019;1.
7. Kenan Degirmenci, Michael H. Breitner. Consumer purchase intentions for electric vehicles: Is green more important than price and range? Elsevier, Transportation Research. Part D. 2017;51(2017):250– 260.
8. Kley F, Lerch C, Dallinger D. New Business Models for Electric Cars: A Holistic Approach. Energy Policy. 2011; 39:3392–3403.
9. Koenig-Lewis N, Palmer A, Dermody J, Urbye A. Consumers' evaluations of ecological packaging–Rational and emotional approaches. Journal of Environmental Psychology. 2014;37:94-105.
10. Krause RM, Carley SR, Lane BW, Graham JD. Perception and reality: Public knowledge of plug-in electric vehicles in 21 US cities. Energy Policy. 2013;63:433– 440.
11. Kumagai J, Managi S. Environmental Behaviour and Choice of Sustainable Travel Mode in Urban Areas: Comparative Evidence from Commuters in Asian Cities. Production Planning & Control; 2019.
12. Kurani & Tal. Electric Cars in California: Policy and Behavior Perspectives; 2014.
13. Labeye E, Adrian J, Hugot M, Regan MA, Brusque C. Daily Use of an Electric Vehicle: Behavioural Changes and Potential for ITS Support. IET Intelligent Transport Systems. 2013;7:210–214.
14. Lan S, Sheng T, Zhang K. Marketing factors of green economic effect on consumers' purchase intention for the market of family-sedan in Taiwan. Research in World Economy. 2014;5(2): 176-188.
15. Peters and Dütschke. How do consumers perceive electric vehicles? A comparison of german consumer groups. J. Environ. Policy Plan. 2014;1-19.
16. Philip R. Walsh. Innovation nirvana or innovation wasteland? Identifying commercialization strategies for small and medium renewable energy enterprises Technovation. 2012;32(2012):32-42.
17. Pretty Bhalla. A Study of Consumer Perception and Purchase Intention of Electric Vehicles, European Journal of Scientific Research. 2018;362-368.
18. Rezvani Z, Jansson J, Bengtsson M. Consumer motivations for sustainable consumption: The interaction of gain, normative and hedonic motivations on electric vehicle adoption. Business Strategy and the Environment. 2018; 27(8):1272–1283.
19. Roger Bennett. Consumer Attitude towards electric vehicles: Effect of product user stereotypes and self-image congruence. European Journal of Marketing. 2018; 52(3/4):499-527.
20. Singer M. Consumer views on plug-in electric vehicles: National Benchmark Report; 2015.

ISSN:1624-1940
http://magellanes.com/

21. Sourkounis C, Ni B, Broy A. Pollution of High Power Charging Electric Vehicles in Urban Distribution Grids. In: 2011 7th International Conference-Workshop on Compatibility and Power Electronics (CPE). IEEE. 2011;34–39.
22. Venkatesh and Davis. A Theoretical Extension of the Technology Acceptance Model: Four Longitudinal Field Studies, INFORMS, Management Science. 2000; 46(2):186-204.
23. Venkatesh, et al. User Acceptance of Information Technology: Toward a Unified View, MIS QUART. 2003;27(3):425-478.
24. Werther B, Hoch N. E-Mobility as a Challenge for New ICT Solutions in the Car Industry. In: Bruni, R., Sassone, V. (eds.) TGC 2011. LNCS, Springer, Heidelberg. 2012;7173:46–57.
25. Zhang Y, Yu Y, Zou B. Analyzing public awareness and acceptance of alternative fuel vehicles in China: The Case of EV; 2011.
26. Zhou Z, Nie L, Ji H, Zeng H, Chen X. Does a firm's low-carbon awareness promote low-carbon behaviours? Empirical Evidence from China. J. Cleaner Prod. 2020;244:118903.
27. https://beeindia.gov.in/content/e- mobility
28. https://www.ibef.org/download
29. https://en.wikipedia.org/wiki/Electric Vehicle_Industry_in_India
30. https://home.kpmg/in/en/home/insights/2020/10/electric-vehicle-mobility-ev adoption.html
31. https://www.marketsandmarkets.com/Market-Reports/electric-vehicle-market-209371461.html
32. https://www.virta.global/global- electric-vehicle-market
33. https://unfccc.int/process-and- meetings/the-paris-agreement