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Factors Influencing Electric Vehicle Purchases in India: A Quantitative Study

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Abstract

Environmental concerns and dwindling fossil fuels drive the transition from internal combustion engines to electric vehicles (EVs). This study investigated the factors influencing Indian consumers' EV purchase intentions. Data from 439 respondents, including EV and non-EV owners, were collected using a 12-item survey. A binomial logistic regression model assessed the impact of environmental benefits (EB), cost and economic benefits (CEB), performance and technology benefits (PTB), and social image (SI) on EV purchase decisions among Indian consumers. Results indicate that environmental benefits, cost and economic benefits, and performance and technology benefits significantly influence consumer decisions, while social image does not. These findings underscore the crucial role of financial factors and vehicle performance in driving EV adoption in India. Implications for government policies and consumer decision-making are discussed.

Keywords: *Electric Vehicles, Consumer Behavior, Environmental Benefits, India, Sustainable Mobility.*

INTRODUCTION

The global automotive industry is undergoing a paradigm shift. For the past century, the internal combustion engine (ICE) has dominated primarily due to the ease of use, availability, and low cost of fossil fuels. However, the transition to electric mobility has become imperative due to the rapid depletion of fossil fuels, rising energy costs, the environmental impact of transportation, and concerns over climate change (IEA, 2009). These issues are prompting governments and automotive industries worldwide to invest heavily in developing and adopting vehicles based on alternative propulsion systems, including electric mobility. According to a report by the International Energy Agency (IEA) 2009, fossil fuel-based transportation is the second largest source of CO2 emissions globally. The diffusion of electric vehicles (EVs) can mitigate numerous environmental problems, including air pollution, oil dependency, greenhouse gas emissions, and global warming. Most countries have taken action to provide policy incentives aimed at encouraging consumers to purchase electric vehicles (Bilotkach & Mills, 2012). The demand for EVs has surged in recent years, transforming the landscape of road transport. In 2021, global electric car sales reached 6.6 million, with 16.5 million electric cars on the road (IEA, 2022). Nevertheless, electric vehicles have yet to become a ubiquitous global phenomenon.

For emerging economies like India, the urgency to find viable alternatives for sustainable mobility is heightened by rapid economic development and high GDP growth (Bhardwaj, Sharma, & Tiwari, G. 2020; EcoGears. (n.d); Economic Times, 2019). The evolution of electric vehicles in India has been gradual, beginning with initial attempts in the 1990s. Early efforts included electric three-wheelers and buses, such as the Vikram SAFA by Scooters India Ltd. and an electric bus by BHEL. These early models faced challenges such as high costs and limited battery life. The market saw some progress with the entry of REVA in 2001, which sold around 1,500 cars in India. However, high battery costs and inadequate charging infrastructure have remained significant barriers to widespread adoption. Major car manufacturers like TATA Motors and Maruti Suzuki have also showcased electric vehicle models in recent years.

The Government of India has been supporting electric mobility efforts in the country. 2013, the government launched the National Electric Mobility Mission Plan (NEMMP) 2020. It aimed to enhance domestic manufacturing capabilities and emphasized local production of components to reduce costs and improve vehicle robustness suited to Indian conditions. Government-industry collaboration is encouraged to build a sustainable manufacturing ecosystem with significant investments in research and development. An ambitious target is to achieve 6-7 million sales of hybrid and electric vehicles annually from 2020 onwards. The

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government aims to provide fiscal and monetary incentives to kick-start this nascent technology. Additionally, the Department of Heavy Industry (DHI), the nodal department for the automotive sector, has been funding research, design, development, and demonstration projects and spearheading the electric mobility initiative in the country. In the recent past (2010-2012), the Ministry of New and Renewable Energy (MNRE) has also incentivized the purchase of electric vehicles through its Alternate Fuels for Surface Transportation Program (AFSTP) scheme, which had an outlay of ₹95 crores. The government is also focusing on developing the necessary infrastructure, such as charging stations, to support the widespread adoption of EVs. Standards and testing procedures are being established to ensure safety and reliability. These efforts aim to create a viable market for EVs, ultimately reducing reliance on fossil fuels and contributing to environmental sustainability (Press Information Bureau, 2024).

Most recently, on March 15, 2024, the Union Government of India approved a comprehensive scheme to promote India as a prime manufacturing destination for electric vehicles. The policy aims to attract significant investments from global EV manufacturers by offering incentives and creating a conducive environment for high-tech EV production in India (Press Information Bureau, 2024). This initiative is expected to provide Indian consumers access to the latest EV technologies, bolster the Make in India initiative, and enhance the country's overall EV ecosystem. The policy mandates a minimum investment of ₹4150 crore (approximately USD 500 million), with no cap on the maximum investment. Companies are given a three-year timeline to set up their manufacturing facilities and commence commercial production of EVs. This policy is anticipated to lead to high production volumes, economies of scale, reduced production costs, lower crude oil imports, a reduced trade deficit, decreased air pollution—particularly in urban areas—and positive impacts on public health and the environment. It also supports India's climate goals of reducing emissions intensity by 45% by 2030 and achieving net-zero emissions by 2070 (NEMMP, 2020; Press Information Bureau, 2024).

Despite these efforts, the EV market in India faces several challenges (Chandran, Madhavan, & Singh, 2022; Economic Times Auto, 2020). The limited availability of charging infrastructure, particularly outside major cities, and the high costs associated with installation and maintenance pose significant barriers (Press Information Bureau, 2024). The high upfront cost of EVs, driven by expensive battery technology, and a lack of consumer awareness further hinder market penetration (Das & Jha, 2021). Supply chain issues and policy uncertainties add to the complexities, making it difficult for automakers and consumers to plan for the future ((NEMMP, 2020; Press Information Bureau, 2024). These barriers necessitate comprehensive policy interventions and industry collaboration to foster a conducive environment for EV adoption (Kumar & Kumar, 2019; NEMMP, 2020).

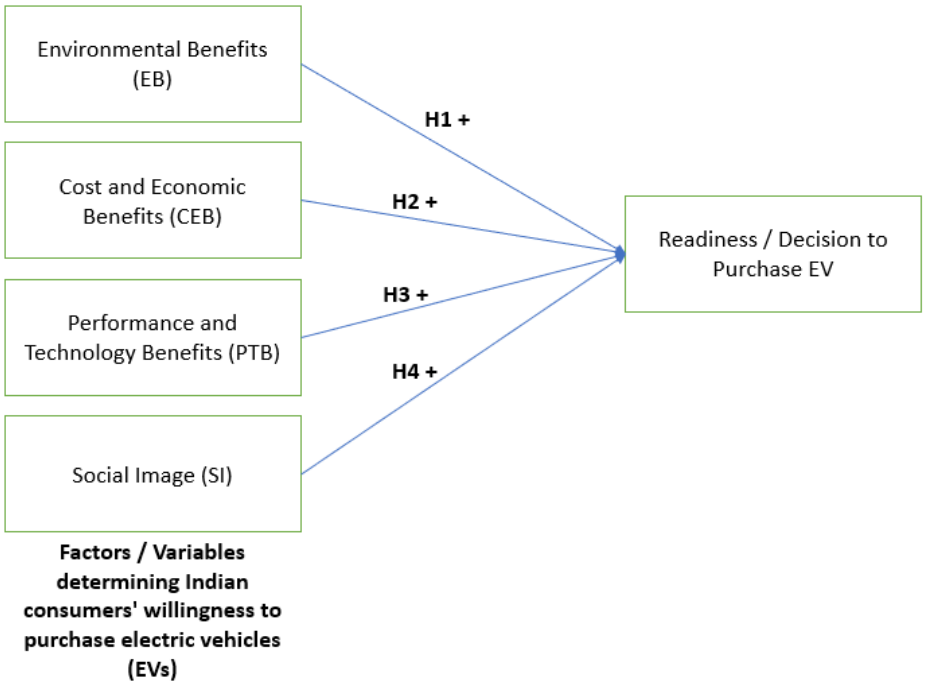
Acknowledging the rapid development of electric vehicles, many researchers have focused on studying consumers' adoption of EVs. A significant and widespread issue in this field is individual willingness to purchase EVs and the influential factors (Hidrue et al., 2011; Peters & Dütschke, 2014; Lieven et al., 2011; Turrentine & Kurani, 2007; Thomas, 2009). However, the majority of these studies have been conducted in Western countries (Egnér & Trosvik, 2018; Hidrue et al., 2011; Turrentine & Kurani, 2007; Lieven et al., 2011; Thomas, 2009; Peters & Dütschke, 2014), as the concept of electric vehicles originated in developed countries.

In recent years, developing nations, including India, have intensified efforts to promote electric vehicles (EVs) in response to energy depletion and environmental concerns (Mishra, Singh, & Gupta, 2021; Global et al., 2021). However, the research landscape on EVs in India remains relatively nascent, limiting our understanding of the factors influencing consumer adoption. This study addressed this gap by investigating the determinants of Indian consumers' willingness to purchase EVs. Specifically, it explored the impact of environmental benefits (EB), cost and economic benefits (CEB), performance and technology benefits (PTB), and social image (SI) on EV purchase decisions. By examining these factors, the research sought to identify their influence on consumers' readiness to adopt EVs and gain insights into their perceptions of this emerging technology.

The Research Model and Hypotheses Summary

The Conceptual model and variables with the four hypotheses used in this study are illustrated in Figure 1 below.

Figure 1: Conceptual Research Model



Exogenous variables, as a variable (X) comprising of "Factors / Variables determining Indian consumers' willingness to purchase EVs" measured through perceived Environmental Benefits (EB), Cost and Economics benefits (CEB), Performance and Technology Benefits (PTB), and Social Image (SI).

Endogenous variable, as dependent variable (Y) that is readiness or decision to purchase EV (Yes/No).

H1: Perceived environmental benefits (EB) have a positive impact on Indian consumers' willingness to purchase electric vehicles (EVs).

H2: Perceived cost and economic benefits (CEB) positively affect Indian consumers' inclination to buy electric vehicles (EVs).

H3: Perceived performance and technology benefits (PTB) positively influence Indian consumers' readiness to purchase electric vehicles (EVs).

H4: Perceived social image (SI) positively impacts Indian consumers' decision to buy electric vehicles (EVs).

METHODOLOGY

Research Design

A quantitative approach was adopted as the research method, relying primarily on hypothesis testing. Lichtman (2013) argues that the quantitative approach emphasizes numbers and figures in data collection and analysis. Most mainstream electric vehicle researchers have also used quantitative analysis as a research method (Axsen et al., 2012; Carley et al., 2013; Egbue & Long, 2012; Jensen et al., 2013; Krupa et al., 2014; Lieven et al., 2011; Schuitema et al., 2013).

Data Collection Instrument (Survey Questionnaire)

A twelve-item questionnaire was designed as the main instrument for collecting data from participants. The questionnaire consisted of two parts: the first part collected the socio-demographic background of respondents, and the second part included questions about the perception of electric vehicles to test the proposed model. Tables 1 and 2 show the survey questions related to the background of respondents and perception of electric vehicles (with exogenous and endogenous variables), respectively.

INSERT Table 1 and 2 here

Table 1Survey Questions (Background of Participants)

Sno.	Survey Question	Reasoning/ Identity	Measure
1	Age	Demographic	Nominal categories
2	Gender	Demographic	Dichotomous Nominal
3	Education	Demographic	Nominal categories
4	Monthly Income	Demographic	Nominal categories
5	Marital Status	Demographic	Nominal categories
6	Have you ever owned a personal vehicle?	Demographic	Nominal categories
7	Have you ever driven electric vehicle?	Demographic	Dichotomous Nominal

Table 2Survey Questions (To test the proposed research model)

Survey Items (8, 9, 10, 11 and 12)	Measure of Survey Items	Variable (Themes)	Indictor
8A: Electric cars protect from global warming (reduces emissions). 8B: Electric vehicles are environmentally friendly because they have zero emissions.	Likert 1-5 (Strongly Disagree to Strongly Agree)	Environmental Benefits (EB): Exogenous Variable	Perceived Positive impact of electric vehicles on the environment
9A: The cost to charge an electric vehicle is much less than the fuel costs for a petrol or diesel vehicle (cheaper to operate). 9B: Electric vehicles cost about the same to buy as petrol or diesel vehicles (comparable purchase price).	Likert 1-5 (Strongly Disagree to Strongly Agree)	Cost and Economics benefits (CEB): Exogenous Variable	Perceived Financial advantages of owning an electric vehicle
10A: Electric cars can replace regular cars in terms of satisfying customer needs (fulfills needs as well as traditional cars). 10B: Electric vehicles are much quieter than other vehicles (quieter operation). 10C: Electric vehicles have excellent acceleration (faster acceleration). 10D: Electric vehicle technology has improved, and they now have a much better range (increased driving distance on a single charge).	Likert 1-5 (Strongly Disagree to Strongly Agree)	Performance and Technology Benefits (PTB): Exogenous Variable	Perceived Technological and performance-related advantages of electric vehicles
11A: Buying an electric car will have a positive effect on my image (seen as environmentally conscious). 11B: Buying an electric car will show my beliefs and what I stand for (represents environmental values).	Likert 1-5 (Strongly Disagree to Strongly Agree)	Social Image (SI): Exogenous Variable	Perceived Enhancement of personal image and values associated with owning an electric vehicle
12: Pick one out of the two: (a) I am satisfied and ready to buy an electric car (b) There are many challenges and I am not ready to buy an electric car presently	Dichotomous Nominal	Readiness / Decision to Purchase EV (Endogenous Variable)	Consumer's readiness to purchase or not purchase an electric vehicle

Quality Criteria of Questionnaire

The concept of reliability addresses whether a study's findings can be replicated (Bryman & Bell, 2019). The survey garnered 439 responses, ensuring an adequate dataset for thorough data analysis. The survey included 12 questions aimed at assessing attitudes, and the Cronbach's Alpha correlation coefficient obtained was 0.683, indicating moderate reliability, which is deemed sufficient for this research (Saunders et al., 2019). According to Bryman and Bell (2011), validity represents one of the most critical criteria in research, denoting the credibility of the conclusions drawn from a study. Construct validity, also known as measurement validity, is a fundamental criterion in quantitative research, particularly in the social sciences, to ensure that a measure accurately reflects the concept it intends to measure (Bryman & Bell, 2011; Saunders et al., 2019). This study established construct validity by drawing on previous research conducted with similar methodologies and relevant theories. In designing this research, external validity was carefully considered to ensure sufficient data collection and comprehensive analysis. The study's relevance extends to the industry and to municipalities and

governmental bodies in India, providing insights into the current gaps and challenges concerning electric vehicles.

Sample and Data Collection

The study targeted users and non-users of electric vehicles, including owners of hybrid and conventional fossil fuel vehicles and prospective car buyers seeking information about purchasing a motor vehicle. A sample of 500 participants was meticulously chosen using judgmental sampling techniques, yielding 446 completed responses. After scrutiny for missing data, seven questionnaires were excluded, leaving 439 for subsequent analysis, with an approximate 87.8% response rate.

Table 3Socio-Demographic Characteristics of the Sample (N = 439)

Variable	Category	Frequency (n)	Percentage (%)
Age (Q1)	25 or Younger	51	11.6
	26-30	92	21.0
	31-40	142	32.3
	41-50	117	26.7
	51 or Older	37	8.4
	Total	**439**	**100.0**
Gender (Q2)	Female	235	53.5
	Male	200	45.6
	Total	**439**	**100.0**
Education (Q3)	Bachelor's Degree	148	33.7
	High School	70	15.9
	Master's Degree	167	38.0
	PhD	53	12.1
	Total	**439**	**100.0**
Income (Q4)	100000-200000	76	17.3
	200000-300000	150	34.2
	300000-500000	128	29.2
	Less than 100000	45	10.3
	More than 500000	40	9.1
	Total	**439**	**100.0**
Marital Status (Q5)	Married with Kids	123	28.0
	Married without Kids	153	34.9
	Unmarried	161	36.7
	Total	**439**	**100.0**
Vehicle Ownership (Q6)	No, I never owned a vehicle	216	49.2
	Yes, fully electric vehicle	145	33.0
	Yes, hybrid/electric/petrol/diesel	77	17.5
	Total	**439**	**100.0**
Driven Electric Car (Q7)	No	271	61.7
	Yes	167	38.0
	Total	**439**	**100.0**

Note: Percentages may not sum to 100% due to rounding.

Table 3 presents the sample's demographic characteristics (N = 439). The age distribution of the respondents indicates that the largest age group is 31-40 years old, comprising 32.3% of the sample, followed by the 41-50 age group at 26.7%. Respondents aged 26-30 account for 21.0%, while those 25 or younger comprise 11.6% of the sample. The smallest age group is those 51 or older, representing 8.4%. In terms of gender, the sample is predominantly female (53.5%), with males accounting for 45.6%. Education levels among respondents vary,

with 38.0% holding a Master's degree, 33.7% possessing a Bachelor's degree, 15.9% having a high school education, and 12.1% having a PhD. Income distribution shows that most respondents (34.2%) have an annual income between 200,000 and 300,000, followed by 29.2% earning between 300,000 and 500,000. Those earning 100,000-200,000 account for 17.3%, and those with less than 100,000 make up 10.3%. A smaller portion, 9.1%, earns more than 500,000 annually. Marital status is distributed, with 34.9% of respondents being married without kids, 36.7% unmarried, and 28.0% married with kids. Regarding vehicle ownership, 49.2% of the respondents have never owned a personal vehicle, 33.0% have owned a fully electric vehicle, and 17.5% have a hybrid/electric/petrol/diesel vehicle. Lastly, 61.7% of respondents have never driven an electric car, whereas 38.0% have had the experience of driving an electric vehicle.

Data Analysis

Data analysis occurred in two stages. Initially, descriptive statistical techniques were used to understand the sociodemographic profile of the respondents. The insights from these survey questions highlight the complexity of the Indian consumer market for electric vehicles. Demographic factors such as age, gender, education, and income significantly shape perceptions and adoption rates. Awareness and familiarity with EV models vary significantly, indicating the need for targeted educational campaigns. Additionally, statistical regression was performed using SPSS software to validate the conceptual model and the hypothesized relationship.

RESULTS

The study investigated the factors determining Indian consumers' willingness to purchase electric vehicles. Specifically, the study explored how environmental benefits (EB), cost and economic benefits (CEB), performance and technology benefits (PTB), and social image (SI) influenced the willingness or decision to purchase EVs in Indian consumers. The proposed model and hypotheses were tested using binominal logistic regression. A binomial logistic regression (often referred to simply as logistic regression) predicts the probability that an observation falls into one of two categories of a dichotomous dependent variable (decision to buy EV: yes or no) based on one or more independent variables (EB, CEB, PTB, and SI) (Hosmer et al., 2013; Peng et al., 2002; Menard, 2002). A sample size of 439 individuals was chosen to ensure sufficient statistical power to identify high exogenous variables as a significant predictor of endogenous variables, effectively reducing Type II errors. The assumptions for carrying out logistic regression were checked. The dependent variable measured was on a dichotomous scale. The dichotomous variables included readiness or decision to purchase EV or not (two groups: "1" and "2"). The model had four independent variables, which were continuous (i.e., an interval or ratio variable). The continuous variables were EB, CEB, PTB, and SI. Observations were independent and the dependent variable did have mutually exclusive and exhaustive categories. Finally, there was a linear relationship between all continuous independent variables and the logit transformation of the dependent variable.

The statistical analysis presented a significant chi-square statistic ($\chi 2(4) = 23.502$, $p < .0005$) (Table 4), robustly refuting the null hypotheses and signifying that consumers' perception of electric vehicles predicts their readiness to buy them. This finding accentuates the considerable effect of EB, CEB, PTB, and SI on the likelihood of buying an EV within our study group. The Cox & Snell R Square and Nagelkerke R Square values were calculated, which are both methods of calculating the explained variation (Table 5). The results showed that the explained variation in the dependent variable based on our model ranges from 34.0% to 44.5%, depending on reference to the Cox & Snell R2 or Nagelkerke R2 methods, respectively. Since Nagelkerke R2 is a modification of Cox & Snell R2, the latter cannot achieve a value of 1. For this reason, it is preferable to report the Nagelkerke R2 value. Thus, in the present model, 44.5 % variation is observed by participants in their readiness to buy EVs and correctly classified 66.2% of cases. In logistic regression, the percentage of correctly classified cases refers to the model's overall accuracy in predicting the dependent variable (in this case, the readiness to purchase an electric vehicle) (Hair et al., 2010; Field, 2018). An overall percentage of 66.2% means that the logistic regression model correctly predicted the readiness to purchase an EV for approximately 66.2% of the cases (Table 6). In other words, the model accurately classified the outcome for about two-thirds of the participants. This metric indicates the model's predictive performance, with higher values indicating better performance in correctly classifying the outcomes. Further, table 7 shows the contribution of each

independent variable to the regression model and its statistical significance. The results show that variables environmental benefits (EB) (B = 0.187, p = .003), cost and economic benefits (CEB) (B = 0.274, p = .021), and perceived performance and technology benefits (PTB) (B = 0.198, p = .039) were significant predictors of readiness to purchase EV. Social image (SI) (B = 0.067, p = .342) was not a significant predictor. A one-unit increase in the environmental benefits score is associated with an 18.7-unit increase in the readiness to purchase an EV. A one-unit cost and economic benefits score increase is associated with a 27.4 unit increase in the readiness to purchase an EV. A one-unit increase in the perceived performance and technology benefits score is associated with a 19.8-unit increase in the readiness to purchase an EV. Based on the information provided in the table, here is the logistic regression equation for the model:

Log (Odds of EV Purchase Readiness) = -1.133 + 0.187EB + 0.274CEB + 0.198PTB

Since logistic regression deals with probabilities, the results are typically interpreted as odds ratios, not as increases or decreases (Hosmer et al., 2013). However, the Exp(B) values in Table 7 provide a way to understand the direction and relative strength of the relationships between the independent and dependent variables (readiness to purchase EV). Exp(B) values represent the change in odds associated with a one-unit increase in the respective variable's score. Exp(B) of 1.024 shows that a one-unit increase in the environmental benefits score is associated with a 1.024 times increase in the odds of being ready to purchase an EV. This is a minimal increase, suggesting a weak positive association. Exp(B) of 7.027 shows that a one-unit increase in the cost and economic benefits score is associated with a 7.027 times increase in the odds of being ready to purchase an EV. This strong positive association indicates that cost and economic factors significantly influence purchase readiness. Exp(B) value of 0.984. is very close to 1, suggesting a near-neutral effect. This means that a one-unit increase in the perceived performance/technology score has a very slight negative association with the odds of being ready to purchase an EV (though not statistically significant based on the p-value).

Table 4Hosmer and Lemeshow Test

Step	Chi-square	Df	Sig.
1	23.502	8	.000

Table 5
Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	556.672[a]	.340	.445

Table 6
Classification Table

	Observed		Predicted		
			Readiness to purchase EV		Percentage Correct
			No	Yes	
Step 1	Readiness to purchase EV	No	45	142	24.1
		Yes	36	183	83.6
	Overall %				66.2

a. The cut value is .500

Table 7
Regression Model (n = 439)

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
								Lower	Upper
Step 1[a]	EB	.187	.038	9.133	1	.003	1.024	.987	1.251
	CEB	.274	.058	1.611	1	.021	7.027	1.286	10.029
	PTB	.198	.056	4.266	1	.039	.984	.882	1.098
	SI	.067	.071	.902	1	.342	1.070	.931	1.229
	Constant	-1.133	2.864	0.259	1	.056	.265		

a. Variable(s) entered on step 1: EB, CEB, PTB, SI.

In summary, the results offered comprehensive insights into the factors that influence the readiness of Indian consumers to purchase electric vehicles (EVs). Hypotheses H1, H2, and H3 confirm that the attributes of environmental benefits, cost and economic benefits, and performance and technology benefits significantly impact consumer decisions. In contrast, rejection of H4 indicates that social image does not significantly impact consumer decisions.

DISCUSSION

The primary aim of this research was to thoroughly understand the factors influencing Indian consumers' readiness to buy EVs. The impact of four key factors—environmental benefits (EB), cost and economic benefits (CEB), performance and technology benefits (PTB), and social image (SI)— were investigated on the likelihood of consumers in the Indian market deciding to buy an electric vehicle. The analysis used a logistic regression model to predict this likelihood based on the factors. The overall model was statistically significant, indicating that the combination of EB, CEB, PTB, and SI significantly predicts consumers' readiness to buy EVs. Individual Predictor Analysis showed that environmental benefit was a significant predictor, indicating that environmental considerations positively influence the readiness to purchase EVs. The perceived cost and economic benefit were the strongest predictors, suggesting that economic factors heavily drive consumer decisions (Hagman et al., 2016). The performance and technology benefits of buying an EV were also significant predictors, emphasizing the importance of advanced technology and performance features. However, social image was not a significant predictor, suggesting that social image has a minimal impact on the decision to purchase EVs in the Indian context.

The significant influence of environmental benefits on the decision to purchase EVs underscores the growing environmental consciousness among Indian consumers. This trend reflects the broader societal shift towards sustainability, driven by increasing awareness of climate change and pollution (Neumann et al., 2010; Rolim, Gonçalves, Farias, & Rodrigues, 2012). In urban centers like Delhi and Mumbai, where air quality often reaches hazardous levels, the idea of contributing to a cleaner environment by adopting EVs resonates strongly with consumers (Climatelinks, n.d.). This environmental awareness is further bolstered by government campaigns promoting green initiatives and stricter regulations on vehicle emissions (Chen & Chai, 2010; Kilbourne & Pickett, 2008; Li, 2017). The results indicate that Indian consumers are not just passively aware of environmental issues but are actively seeking solutions that allow them to contribute to environmental sustainability. Therefore, for EV manufacturers and policymakers, emphasizing the ecological benefits of EVs—such as zero emissions and reduced carbon footprint—can significantly enhance consumer appeal (Transport & Environment, 2020).

The study found cost and economic benefits to be the most influential factor in consumers' readiness to purchase EVs. This finding is particularly pertinent in the Indian context, where financial considerations heavily influence consumer behavior. The higher initial cost of EVs is often a barrier; however, the potential for long-term savings through lower running and maintenance costs, combined with government incentives such as subsidies and tax rebates, makes EVs economically attractive (Delucchi & Lipman, 2001; Hidrue et al., 2011). This economic appeal is critical in a price-sensitive market like India. Rising fuel prices have also made the cost argument for EVs stronger. The significant weight given to economic benefits in the decision-making process

suggests that highlighting the total cost of ownership, rather than just the purchase price, can be a persuasive strategy for EV adoption. EV manufacturers should focus on educating consumers about the financial advantages of EVs, including the savings on fuel and maintenance, to counter the perception of high initial costs.

Performance and technology benefits were also significant predictors of EV purchase readiness. This reflects a shift in consumer expectations towards advanced technology and superior vehicle performance. Indian consumers, particularly in urban areas, are increasingly tech-savvy and appreciate features such as regenerative braking, advanced battery technology, and smart connectivity that many EVs offer (Al-Emran & Shaalan, 2021; Berkeley et al., 2018). The emphasis on technology and performance benefits indicates that consumers are looking for vehicles that are not only environmentally friendly and economical but also innovative and high-performing. This preference aligns with the broader trend of technological adoption in India, where consumers are becoming more accustomed to digital and smart technologies. For EV manufacturers, it is crucial to continue investing in and showcasing technological advancements and performance improvements to meet these evolving consumer expectations (Jeong et al., 2016).

Interestingly, the social image did not emerge as a significant predictor of EV purchase readiness. This suggests that, in contrast to some other markets where the prestige of owning an EV may be a significant factor, Indian consumers prioritize practical benefits over social status. This finding implies that while social image might play a role, it is overshadowed by more tangible factors like cost savings and environmental benefits. This practical approach could be attributed to the diverse socio-economic landscape in India, where functional advantages often outweigh the desire for status symbols. For marketers, messaging should focus more on the real-world benefits of EVs rather than trying to position them as luxury or status items (Coffman et al., 2017).

The study's findings display several inferences for the Indian consumer market for EVs. First, they highlight the importance of addressing practical concerns and emphasizing tangible benefits. Environmental benefits, cost savings, and technological advancements are key drivers of EV adoption (Financial Express, 2020). Policymakers and manufacturers need to focus on these aspects to enhance consumer readiness (EV Reporter, n.d.). Environmental campaigns should continue to stress the positive impact of EVs on urban air quality and climate change (Climatelinks, n.d.). Economic incentives should be communicated clearly to highlight the long-term savings despite higher initial costs (Wulandari et al., 2015; Van Vliet et al., 2011; Helmers & Marx, 2012). Additionally, the significance of performance and technology benefits suggests that continuous innovation and improvement in EV technology will be crucial for sustaining consumer interest. Manufacturers should invest in R&D to enhance battery life, reduce charging time, and integrate advanced technological features. Demonstrations and test drives that showcase EVs' superior performance and innovative technology could effectively convert hesitant consumers. Finally, the finding that social image is not a significant factor indicates that marketing strategies should focus on practical advantages rather than aspirational branding. The Society of Indian Automobile Manufacturers (2017) mentions that Indian consumers are more influenced by how an EV can meet their daily needs and provide financial and environmental benefits rather than its potential as a status symbol. This practical approach aligns well with India's diverse and economically varied consumer base. Thus, the study reveals that for the Indian market, the adoption of EVs is primarily driven by practical benefits related to the environment, cost, and technology. Manufacturers and policymakers should align their strategies to these priorities to effectively promote EV adoption in India. By addressing the specific needs and concerns of Indian consumers, the transition to electric vehicles can be accelerated, contributing to a cleaner environment and a more sustainable transportation system.

CONCLUSION

The findings from this study provide critical insights into the evolving landscape of the Indian electric vehicle (EV) market. The increasing environmental consciousness among consumers and the recognition of long-term economic benefits and government incentives signifies a positive shift towards sustainable transportation. However, the minimal impact of social image on purchase decisions suggests that consumers prioritize practicality over status symbols regarding EV adoption. The study shows that addressing consumer concerns and fostering the adoption of EVs in India requires a multi-faceted approach. By focusing on awareness and

education, financial incentives and affordability, infrastructure development, market research and product development, strategic partnerships, and societal and environmental benefits, stakeholders can create a more conducive environment for EV adoption and drive a sustainable transformation in the transportation sector. These strategies will be crucial for stakeholders in the Indian EV industry to capitalize on the increasing interest and drive adoption among diverse consumer segments.

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