

## FROM HESITATION TO ADMIRATION: INVESTIGATING THE EVOLVING CONSUMER ATTITUDES TOWARDS GREEN MARKETING STRATEGIES FOR ELECTRIC VEHICLES IN INDIA

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### **Abstract**

**Purpose:** This research investigates evolving consumer attitudes towards green marketing strategies, specifically focusing on electric vehicles (EVs). The aim is to understand how consumer perceptions and preferences change over time and identify influencing factors. **Methodology:** Using a mixed-methods approach, qualitative and quantitative research methods are employed. Qualitative data is collected through questionnaire to explore consumer perceptions, motivations, and concerns regarding green marketing strategies. A large-scale survey is conducted to validate and measure these qualitative findings. **Findings:** Consumer attitudes towards green marketing strategies for EVs undergo a transformative journey. Initially hesitant due to concerns like charging infrastructure, costs, and range anxiety, consumers shift towards admiration and acceptance with increased knowledge and positive experiences. Trust and transparency play key roles, as consumers seek authentic strategies aligned with their values. **Implications:** The research holds significant implications for businesses, marketers, and policymakers. Effective communication and personalized messaging are vital for conveying the environmental benefits of EVs and green marketing. Addressing consumer concerns fosters positive attitudes towards sustainable products and practices, driving green marketing adoption, promoting sustainability, and contributing to a greener future. Beyond marketing, the findings provide insights into consumer behavior and preferences related to sustainability. Policymakers can leverage these insights to develop strategies that encourage EV adoption and sustainability. Ultimately, the research contributes to the broader goal of creating an environmentally conscious society.

**Keywords:** Green Marketing Strategies, Electric Vehicles (EVs), Sustainability, Consumer Perceptions on EVs)

### **1. INTRODUCTION**

In recent years, there has been a growing global concern about the environmental impact of various industries and the need for sustainable practices (Steffen et al., 2015). As a result, businesses have increasingly turned to green marketing strategies to meet the changing preferences and demands of consumers. Green marketing focuses on promoting products and services that are environmentally friendly, emphasizing their positive impact on the planet (Peattie, 1995). One sector that has witnessed a significant shift towards green marketing is the automotive industry, particularly with the rise of electric vehicles (EVs). EVs offer a promising alternative to traditional internal combustion engine (ICE) vehicles, as they produce lower emissions and contribute less to air pollution and greenhouse gas emissions (Dunn, 2019). As a result, EVs have become a focal point for green

marketing strategies, aiming to attract environmentally conscious consumers and promote sustainable transportation options.

However, consumer attitudes towards green marketing strategies for EVs are dynamic and can evolve over time. Initially, consumers may have reservations and concerns about the practicality, affordability, and reliability of EVs. Common concerns include limited charging infrastructure, high costs, and range anxiety – the fear of running out of battery power during a trip. These initial barriers may hinder consumer acceptance and adoption of EVs, thereby influencing the effectiveness of green marketing strategies.

Understanding how consumer perceptions and preferences change over time regarding green marketing strategies for EVs is crucial for businesses, marketers, and policymakers. By gaining insights into these evolving attitudes, stakeholders can develop more effective strategies to promote sustainable products and practices, address consumer concerns, and encourage the adoption of EVs. Moreover, such research can contribute to the broader goal of fostering an environmentally conscious society by promoting sustainable alternatives in various sectors.

### **1.1 Electronic Vehicles Market in India:**

The electronics market in India has witnessed remarkable growth and transformation over the past few decades. From being a market primarily driven by imports, India has emerged as one of the world's largest consumer electronics markets, attracting global manufacturers and experiencing a surge in domestic production. Let's examine the evolution of the electronics market in India from its inception to the present day. In the early years after India gained independence in 1947, the electronics market was in its nascent stage. The country heavily relied on imports to meet its electronics needs. The focus was mainly on basic consumer goods like radios, televisions, and household appliances. During this period, the market was highly regulated, with stringent government control over imports and limited domestic production capabilities.

In the early 1990s, India embarked on a path of economic liberalization and market reforms. The government has initiated policies to encourage foreign investment, ease import restrictions, and promote domestic manufacturing. These reforms opened up the Indian market to global players, leading to an influx of multinational electronics companies. With the advent of globalization and technological advancements, the electronics market in India experienced a significant shift. The rise of the IT and software services industry fueled the demand for computers, laptops, and other digital devices. The proliferation of mobile phones and the internet further revolutionized the electronics landscape, connecting millions of Indians to the digital world.

Recognizing the potential for growth, the Indian government launched the "Make in India" campaign in 2014. This initiative aimed to transform India into a global manufacturing hub and promote domestic production of electronics. Special economic zones and incentives were introduced to attract investment, leading to the establishment of manufacturing facilities by major electronics companies.

The advent of e-commerce platforms in India further accelerated the growth of the electronics market. Online marketplaces provided a convenient and accessible platform for consumers to browse and purchase a wide range of electronics products. E-commerce also facilitated the entry of new players and increased competition, leading to greater product availability and competitive pricing. In recent years, there has been a notable shift towards smart and connected devices in the Indian electronics market. Smartphones, smart TVs, wearable devices, and home automation systems have gained popularity among consumers. The increasing affordability of these devices, coupled with improving internet connectivity, has driven their widespread adoption. The Indian government has taken several initiatives to promote digitalization and technology adoption across the country. The

Digital India campaign, launched in 2015, aims to transform India into a digitally empowered society and knowledge economy. These initiatives have not only boosted the demand for electronics but also fostered innovation and entrepreneurship in the tech sector.

India's rising middle class, increasing disposable income, and expanding urban population have contributed to the growth of the electronics market. The demand for consumer electronics, as well as industrial and automotive electronics, continues to rise. India's large population and untapped rural market present immense growth opportunities for electronics manufacturers.

The electronics market in India has undergone a remarkable transformation, transitioning from an import-dependent market to a manufacturing and consumption powerhouse. With a combination of economic reforms, technological advancements, government initiatives, and changing consumer preferences, India has become a significant player in the global electronics industry. The future of the Indian electronics market looks promising, with ongoing digitalization efforts, increasing domestic production, and a growing consumer base.

## **2. NEED FOR THE STUDY**

The study on evolving consumer attitudes towards green marketing strategies for electric vehicles (EVs) in India is crucial for several reasons. Firstly, it addresses pressing environmental concerns, such as air pollution and carbon emissions, by promoting sustainable transportation options. Understanding consumer attitudes will enable businesses and policymakers to develop effective communication and marketing campaigns to encourage EV adoption and reduce greenhouse gas emissions. Secondly, with its large population and growing urbanization, India presents significant market potential for EVs. By investigating consumer attitudes, businesses can identify barriers and drivers influencing adoption, and policymakers can refine policies to address consumer concerns effectively. Additionally, understanding consumer perceptions and preferences will help businesses tailor their marketing strategies, personalized messaging, and product positioning to build trust and gain a competitive edge in the evolving EV market. Moreover, the study will shed light on the role of social and cultural factors, contributing to a better understanding of the unique Indian context. Lastly, by addressing consumer concerns and fostering positive attitudes, the research will promote sustainability, accelerate EV adoption, and contribute to a greener future.

## **3. LITERATURE REVIEW**

Green marketing strategies can be effective in influencing consumer attitudes towards electric vehicles (Trivedi, P, 2019). However, the effectiveness of these strategies may vary depending on the target market and the specific environmental benefits of the product. Consumers are increasingly concerned about the environment, and electric vehicles are seen as a more environmentally friendly option than traditional gasoline-powered vehicles (Jaiswal, A., & Mishra, R, 2023). The cost of electric vehicles is still a barrier for some consumers, but the cost is expected to come down in the future. Government policies can also play a role in encouraging the adoption of electric vehicles (Heffner, R. D., & Wee, S, 2017). Majority of the researches suggests that electric vehicles have the potential to appeal to consumers who are concerned about the environment, but there are still some challenges that need to be addressed (Wang, X., & Zhang, S, 2019). One of the most important strategies is education, as consumers need to be aware of the environmental benefits and cost-savings potential of electric vehicles (Akbar, A., & Sohail, M. S, 2022). Image building can also be effective, as electric vehicles can be marketed as a way to improve one's image. Convenience is also important, as consumers need to be able to easily purchase and maintain electric vehicles (Amoako et. al., 2020). The price of electric vehicles is still a barrier for some consumers, but the price is expected to come

down in the future. Customer attitudes and concerns about EVs are mixed. Some consumers are concerned about the range anxiety, lack of charging infrastructure, high purchase price, performance, and resale value of EVs (Amoako et. al., 2020). However, there are also many reasons why consumers are interested in EVs, such as the environmental benefits, fuel savings, and affordability of these vehicles. As the factors that are holding back EV adoption, such as the range anxiety and lack of charging infrastructure, continue to improve, we can expect to see more consumers adopting EVs in the future. Green marketing is a promising strategy for businesses in India (Godbole, S., & Banerjee, S, 2017). The growing awareness of environmental issues among consumers, combined with the government's support for the green market, creates a favorable environment for businesses that are committed to sustainability (Barbieri, M., & Salvatori, F, 2016). Some of the green marketing strategies that can be used in India include product reformulation, packaging redesign, green labeling, sustainable sourcing, and corporate social responsibility (CSR) (Balasubramanian et. al., 2016). The specific strategies that are most effective will vary depending on the product or service being marketed, the target market, and the competitive landscape. Green marketing on social media is a powerful tool that can be used to reach a wider audience and build relationships with customers and stakeholders (Shani, D., & Chan, K, 2010). Companies can use social media to communicate the environmental benefits of their products and services, tell stories about their sustainability efforts, get involved in the conversation about sustainability, partner with influencers, and use social media analytics to track the effectiveness of their campaigns (Mishra, P., & Mishra, R, 2016). Social media is a great way to build relationships with customers and stakeholders because consumers are more likely to trust information about sustainability that they see on social media (Keller, K. L, 2013). Green marketing campaigns on social media can also be very effective in raising awareness of sustainability issues. Green marketing can benefit businesses, policy makers, and marketers in a number of ways. For businesses, green marketing can help to differentiate their products or services from the competition, attract new customers, and build brand loyalty (Auger et. al., 2009). It can also help businesses to improve their bottom line by reducing costs and increasing efficiency. For policy makers, green marketing can be a way to promote sustainability and encourage businesses to adopt more environmentally friendly practices. Policy makers can use green marketing to educate consumers about sustainability issues and to create a demand for green products and services (Sen, S, Bhattacharya, C. B, 2001). For marketers, green marketing can be a way to connect with consumers who are concerned about the environment. It can also help marketers to build a more positive brand image and to improve their reputation Srinivasan, (S. S., & Banerjee, S. B, 2017).

#### **4. STATEMENT OF PROBLEM**

Evolving consumer attitudes towards green marketing strategies for electric vehicles (EVs) in India lies in the limited number of studies specifically focused on Indian consumers' attitudes towards green marketing strategies for EVs. Additionally, there is a lack of longitudinal studies tracking the evolving nature of consumer attitudes over time. Furthermore, the effectiveness of green marketing strategies in influencing consumer attitudes and the role of trust and transparency in shaping these attitudes remain underexplored. Addressing these research gaps will provide valuable insights for businesses and policymakers in promoting sustainable transportation and EV adoption in India.

## 5. OBJECTIVES

- Explore current consumer attitudes towards green marketing strategies for EVs in India.
- Identify factors influencing consumer attitudes towards green marketing strategies for EVs.
- Analyze the evolving nature of consumer attitudes over time.
- Assess the impact of green marketing strategies on consumer attitudes towards EVs.
- Provide insights and recommendations for businesses, marketers, and policymakers.

## 6. HYPOTHESES

- H<sub>1</sub>: There is a significant relationship between consumer perceptions of green marketing strategies for electric vehicles (EVs) and their likelihood of considering EV adoption.
- H<sub>2</sub>: Consumer concerns about charging infrastructure availability have a significant impact on their attitudes towards green marketing strategies for EVs.
- H<sub>3</sub>: Consumer perceptions of the cost-effectiveness of EVs have a significant influence on their attitudes towards green marketing strategies.
- H<sub>4</sub>: Range anxiety plays a significant role in shaping consumer attitudes towards green marketing strategies for EVs.

## 7. METHODOLOGY

Qualitative research is conducted through a questionnaire, designed to explore consumer perceptions, motivations, and concerns related to green marketing strategies for EVs. A diverse sample of 150 participants is selected, and data is collected through face-to-face interviews or online surveys. Thematic analysis is employed to analyze the qualitative data and identify recurring themes. Additionally, a large-scale survey is conducted with a sample size of 150 participants to validate and measure the qualitative findings. The survey includes structured questions to quantify consumer attitudes and collect demographic information. Descriptive statistics, inferential statistics, and correlation analysis are employed to analyze the quantitative data. The integration of qualitative and quantitative findings provides a comprehensive understanding of consumer attitudes towards green marketing strategies for EVs in India. The methodology enables the identification of key influencing factors and the provision of actionable insights for businesses, marketers, and policymakers to promote sustainable transportation and enhance green marketing strategies for EVs in the country.

## 8. RESULTS

The demographic analysis revealed a diverse sample of 150 respondents, with 65.3% identifying as male and 34.7% as female. In terms of age distribution, 25.3% fell within the 18-35 range, 55.3% were aged 36-50, and 19.3% were aged 50 and above. In the context of occupation, 52.0% were employed, 38.7% were engaged in business, and 9.3% represented other occupations. Regarding income, the distribution indicated that 50.7% reported an income between ₹5,000 and ₹15,000, 15.3% earned between ₹15,001 and ₹25,000, while 15.3% reported incomes ranging from ₹25,001 to ₹50,000, and 15.3% earned ₹50,000 and above. Family size analysis indicated that 5.3% had a family size of 1-4 members, 70.0% had 4-6 members, and 24.7% had families with more than 6 members. Notably, 90.7% of respondents had owned an electric vehicle (EV), while the remaining 9.3% had not yet done so.

**Table 1: Reliability**

Factors	Cronbach's Alpha	No. of Items
Green Marketing Strategies	0.901	8
Consumer Perception	0.840	7
Consumer Adoption	0.854	10
Charging Infrastructure Facilities	0.794	7
Cost Effectiveness of EV's	0.891	9
Range Anxiety	0.858	6
Total	0.856	47

The reliability analysis conducted on the study's factors reveals strong internal consistency among the measurements. With Cronbach's Alpha values ranging from 0.794 to 0.901, the factors, including "Green Marketing Strategies," "Consumer Perception," "Consumer Adoption," "Charging Infrastructure Facilities," "Cost Effectiveness of EV's," and "Range Anxiety," demonstrate reliable measurement of their respective constructs. This collective high level of internal consistency, as indicated by a total Cronbach's Alpha of 0.856 for all 47 items, underscores the dependability of the measurements and enhances the credibility of the study's outcomes.

**8.1 Consumer Perceptions:**

Consumer perceptions of green marketing strategies play a crucial role in establishing the credibility and trustworthiness of EV manufacturers. Transparent and authentic green marketing messages demonstrate a commitment to sustainability and resonate with environmentally conscious consumers. Such trust-building efforts can alleviate skepticism about the performance, efficiency, and longevity of EVs, potentially mitigating psychological barriers like range anxiety. Positive perceptions of green marketing can thereby foster a greater willingness among consumers to seriously consider EV adoption.

**Table 2: Influence of Green Marketing Strategies on Adoption of EV's**

Model Summary						
Model	R	R Square	Adjusted R Square		Std. Error of the Estimate	
1	.663 <sup>a</sup>	.439	.436		.41211	
ANOVA <sup>a</sup>						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	19.709	1	19.709	116.047	.000 <sup>b</sup>
	Residual	25.136	148	.170		
	Total	44.845	149			
Coefficients <sup>a</sup>						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.033	.096		10.722	.000
	GMS_T	.485	.045	.663	10.772	.000
a. Dependent Variable: Consumer Adoption of EV's						
b. Predictors: (Constant), Green Marketing Strategies						

The Table 2, shows that the conducted analysis provides empirical support for the hypothesis that posits a significant relationship between consumer perceptions of green marketing strategies for electric vehicles (EVs) and their likelihood of considering EV adoption. The model's R-squared value of 0.439 indicates that nearly 44% of the variance in Consumer Adoption of EVs can be attributed to variations in Green Marketing Strategies. This demonstrates a substantial alignment with the

hypothesis, as higher consumer perceptions of effective green marketing are indeed associated with an increased likelihood of considering EV adoption. The significant standardized coefficient (Beta) of 0.663 underscores the strength of this relationship, reinforcing the hypothesis that positive perceptions of green marketing strategies significantly influence consumer adoption intentions. This analysis lends empirical weight to the idea that consumer perceptions of green marketing strategies play a pivotal role in shaping their decisions regarding EV adoption, in line with the initially proposed hypothesis. Hence, the formulated hypothesis “There is a significant relationship between consumer perceptions of green marketing strategies for electric vehicles (EVs) and their likelihood of considering EV adoption” is accepted.

**8.2 Consumer Concern towards Charging Infrastructure of EV’s:**

The notion that consumer concerns about the availability of charging infrastructure have a notable influence on their attitudes towards green marketing strategies for electric vehicles (EVs). Charging infrastructure availability is a pivotal factor in the widespread adoption of EVs, as consumers' perception of whether they can conveniently and reliably charge their vehicles directly affects their overall view of the feasibility and practicality of EV ownership. Consumers who have reservations about the accessibility and adequacy of charging stations might approach green marketing strategies with a more skeptical or cautious attitude. Their concerns could stem from the fear of being stranded due to insufficient charging options, commonly referred to as "range anxiety." As such, exploring the intricate interplay between these concerns and their impact on attitudes towards green marketing strategies can yield insights into how such strategies can address and mitigate these apprehensions, thereby fostering a more positive perception of EVs and subsequently promoting their adoption.

**Table 3: Green Marketing Strategies influence on Consumer concerns about Charging Infrastructure**

Model Summary						
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate		
1	.652 <sup>a</sup>	.425	.421	.41286		
ANOVA <sup>a</sup>						
	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	18.652	1	18.652	109.428	.000 <sup>b</sup>
	Residual	25.227	148	.170		
	Total	43.879	149			
Coefficients <sup>a</sup>						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.931	.097		9.642	.000
	GMS_T	.472	.045	.652	10.461	.000
a. Dependent Variable: Charging Infrastructure						
b. Predictors: (Constant), Green Marketing Strategies						

The analysis conducted substantiates the hypothesis that consumer concerns about charging infrastructure availability exert a significant influence on their attitudes towards green marketing strategies for electric vehicles (EVs). The Table 3, underscores the validity of this relationship, with an R-squared value of 0.425 indicating that approximately 42.5% of the variation in Charging Infrastructure attitudes can be accounted for by variations in Green Marketing Strategies. This demonstrates a substantial impact, where consumers who hold apprehensions about the availability and convenience of charging stations tend to view green marketing strategies through a more

cautious lens. These concerns potentially stem from the perceived risk of encountering challenges in maintaining sufficient charge for their vehicles, thereby affecting their overall perception of EV feasibility and practicality. The standardized coefficient (Beta) of 0.652 confirms the strength of this influence, indicating that consumer concerns indeed play a significant role in shaping their attitudes towards green marketing strategies. The high t-value (10.461,  $p < 0.001$ ) further supports the statistical significance of this relationship. These findings not only validate the hypothesis but also emphasize the importance of addressing charging infrastructure concerns in devising effective green marketing strategies for EVs, potentially enhancing consumer perceptions and promoting EV adoption. Hence, “Consumer concerns about charging infrastructure availability have a significant impact on their attitudes towards green marketing strategies for EVs” is accepted.

### 8.3 Cost Effectiveness of EV's:

Green marketing strategies wield significant influence in shaping consumer perceptions of the cost-effectiveness of electric vehicles (EVs). Through transparent communication of reduced fuel and maintenance costs, highlighting government incentives, and dispelling misconceptions about EV affordability, these strategies contribute to a positive view of EVs as financially advantageous options. Leveraging consumers' environmental consciousness, green marketing positions EVs as responsible choices, further enhancing their perceived value. Interactive tools and personalized calculators provide tangible insights, solidifying the perception of cost-effectiveness and fostering consumer adoption of sustainable transportation.

**Table 4: Green Marketing Strategies focus on consumer perceptions towards EV'S Cost-Effectiveness**

Model Summary						
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate		
1	.790 <sup>a</sup>	.625	.622	.37872		
ANOVA <sup>a</sup>						
	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	35.313	1	35.313	246.212	.000 <sup>b</sup>
	Residual	21.227	148	.143		
	Total	56.540	149			
a. Dependent Variable: CCP_T						
b. Predictors: (Constant), GMS_T						
Coefficients <sup>a</sup>						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.471	.089		5.321	.000
	GMS_T	.649	.041	.790	15.691	.000
a. Dependent Variable: Cost Effectiveness of EV's						
b. Predictors: (Constant), Green Marketing Strategies						

The analysis strongly confirms from Table 4, that consumer perceptions of the cost-effectiveness of electric vehicles (EVs) significantly influence their attitudes towards green marketing strategies. The high correlation coefficient ( $R = 0.790$ ) highlights a robust positive relationship between Consumer Perceptions of Cost-Effectiveness and Green Marketing Strategies. The substantial R-squared value of 0.625 indicates that around 62.5% of the variability in Cost Effectiveness can be attributed to variations in Green Marketing Strategies, underscoring the substantial impact of green marketing strategies on shaping perceptions. The regression model's statistical significance ( $p < 0.001$ ), with a



significant F-value of 246.212, confirms the non-random nature of this relationship. The coefficients' analysis reveals that as Green Marketing Strategies increase by one unit, Consumer Perceptions of Cost-Effectiveness increase by 0.649 units, with a high standardized coefficient (Beta = 0.790) underscoring this strong influence. The high t-value (15.691,  $p < 0.001$ ) further confirms the statistical significance. Overall, these results robustly support the hypothesis that Consumer Perceptions of the cost-effectiveness of EVs significantly impact their attitudes towards green marketing strategies. Hence, the formulated hypothesis “Consumer perceptions of the cost-effectiveness of EVs have a significant influence on their attitudes towards green marketing strategies” is accepted.

#### 8.4 Range anxiety of EVs:

The importance of mitigating range anxiety through green marketing strategies to influence the adoption of electric vehicles (EVs) cannot be understated. Range anxiety, stemming from concerns about EVs' limited driving range and access to charging infrastructure, is a significant barrier to widespread adoption. By emphasizing technological advancements, extended ranges, and fast-charging networks, green marketing can alleviate these worries. Highlighting convenient charging options, showcasing charging network expansion, and providing personalized tools can further reassure potential buyers. Moreover, framing EV adoption as an environmentally conscious choice and collaborating with stakeholders to bolster charging infrastructure can strengthen consumer confidence. Green marketing strategies that address range anxiety can thus serve as a catalyst for enhancing consumer perception and driving the adoption of EVs.

**Table 5: Range Anxiety influence Consumer Attitudes**

Model Summary						
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate		
1	.888 <sup>a</sup>	.789	.787	.25293		
ANOVA <sup>a</sup>						
	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	35.376	1	35.376	552.982	.000 <sup>b</sup>
	Residual	9.468	148	.064		
	Total	44.845	149			
Coefficients <sup>a</sup>						
	Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.527	.066		7.959	.000
	Range Anxiety	.900	.038	.888	23.516	.000
a. Dependent Variable: Consumer Attitude						
b. Predictors: (Constant), Range Anxiety						

The analysis (Table 4) strongly underscores the substantial influence of range anxiety on shaping consumer attitudes towards green marketing strategies for electric vehicles (EVs). With a high correlation coefficient ( $R = 0.888$ ) indicating a robust positive relationship between Range Anxiety and Consumer Attitude, and an impressive R-squared value of 0.789 denoting that around 78.9% of Consumer Attitude variability can be attributed to Range Anxiety, this study confirms the significant role of this factor in shaping attitudes. The regression model's statistical significance ( $p < 0.001$ ), reflected in a substantial F-value of 552.982, further solidifies the non-random nature of this relationship. Analyzing coefficients, the constant (0.527) represents Consumer Attitude when Range Anxiety is absent. The coefficient for Range Anxiety (0.900) indicates that for each unit increase in Range Anxiety, Consumer Attitude increases by 0.900 units. The standardized coefficient (Beta =

0.888) underscores the considerable strength of this impact, supported by the high t-value (23.516,  $p < 0.001$ ). Overall, these findings firmly establish that Range Anxiety plays a vital and statistically significant role in shaping consumer attitudes towards green marketing strategies for EVs, underscoring the need to address this factor in promoting EV adoption through effective marketing campaigns. So, the formulated hypothesis "Range anxiety plays a significant role in shaping consumer attitudes towards green marketing strategies for EVs" is accepted.

## **9. DISCUSSIONS**

The comprehensive analysis illuminates the multifaceted relationships between consumer perceptions, green marketing strategies, and the factors influencing the adoption of electric vehicles (EVs). The demographic analysis delves into the respondent landscape, shedding light on gender distribution, age groups, occupations, income levels, family sizes, and EV ownership proportions, providing a holistic context for subsequent investigations. The reliability analysis reinforces the study's robustness by demonstrating high internal consistency across various factors, including Green Marketing Strategies, Consumer Perception, Consumer Adoption, Charging Infrastructure Facilities, Cost Effectiveness of EVs, and Range Anxiety, enhancing the credibility of the findings. The regression analyses meticulously examine hypotheses by exploring the intricate connections between consumer perceptions of green marketing strategies and the likelihood of EV adoption, attitudes towards green marketing strategies and range anxiety, and the influence of consumer perceptions on cost-effectiveness of EVs through green marketing strategies. These analyses reveal substantial R-squared values, significant F-values, and standardized coefficients, affirming the intertwined nature of these variables and supporting the proposed hypotheses. Moreover, the significance of addressing consumer concerns about charging infrastructure availability and range anxiety through green marketing strategies emerges as a central theme. Through accurate information dissemination, highlighting incentives, and addressing psychological barriers, green marketing emerges as a potent tool to shape positive consumer perceptions, thereby impacting attitudes and intentions towards EV adoption. Overall, this comprehensive analysis not only uncovers complex relationships but also offers actionable insights for stakeholders seeking to drive sustainable transportation adoption in the broader pursuit of environmental consciousness.

## **10. RECOMMENDATIONS**

Stakeholders across the spectrum can leverage these insights to shape effective strategies for advancing electric vehicle (EV) adoption. Policymakers and industry players should prioritize investments in expanding charging infrastructure networks, alleviating range anxiety, and providing accessible information to bolster consumer confidence. Green marketing strategies should emphasize tangible benefits, incentives, and the environmental advantages of EVs while addressing concerns. Manufacturers can collaborate with policymakers to incentivize EV ownership and enhance consumer education on charging options. Consumers are encouraged to stay informed about evolving charging infrastructure developments, consider personalized calculators to assess cost-effectiveness, and embrace the environmental benefits of EVs. Additionally, adopting EVs as a sustainable choice contributes to a greener future and collective environmental preservation.

## **11. CONCLUSION**

This comprehensive analysis delves into the intricate web of factors that influence consumer perceptions and attitudes towards electric vehicle (EV) adoption, ultimately shaping the role of green marketing strategies in driving sustainable transportation. The exploration of demographic insights provides a comprehensive understanding of potential adopters, while the reliability analysis

underscores the credibility of collected data. The regression analyses robustly validate hypotheses, confirming the significant relationships between consumer perceptions, green marketing strategies, and influential factors like charging infrastructure availability, range anxiety, and cost-effectiveness. The interplay of these elements highlights the transformative potential of effective green marketing, which can dispel misconceptions, address concerns, and amplify positive attitudes towards EVs. With practical implications for stakeholders spanning policymakers, manufacturers, and consumers, the study calls for targeted strategies to bolster charging infrastructure, tailor marketing messages, and encourage adoption. As the world progresses towards sustainable alternatives, this analysis serves as a roadmap, guiding the transition towards a greener and more environmentally conscious future through the collective efforts of stakeholders and consumers alike.

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