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Influence of Vehicle Performance Perception On Consumer Decisions for Green Vehicles

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ABSTRACT

In the context of growing environmental concerns and the global shift toward sustainable mobility, consumer adoption of green vehicles is increasingly influenced by perceptions of vehicle performance. This study examines the influence of performance perceptioncovering dimensions such as acceleration, driving comfort, battery efficiency, range, maintenance reliability, and overall technological innovationon consumer decision-making for green vehicles in Kanyakumari District, Tamil Nadu. Data were collected from 110 respondents using a structured questionnaire, adopting a convenience sampling method. Statistical analysis was conducted to determine the relationship between perceived performance attributes and purchase intention. Findings indicate that perceived driving range and battery efficiency are the most influential performance factors shaping purchase decisions, followed closely by driving comfort and maintenance reliability. Consumers expressed higher willingness to adopt green vehicles when performance perceptions aligned with their practical mobility needs and when brands demonstrated consistent quality assurance. Interestingly, environmental consciousness alone was insufficient to drive adoption unless coupled with positive performance perceptions. The study concludes that for wider green vehicle adoption in Kanyakumari District, manufacturers must focus on enhancing tangible performance attributes while effectively communicating these improvements to potential buyers. Strategic marketing that integrates both environmental benefits and verified performance claims can significantly strengthen consumer confidence and accelerate the transition toward sustainable transportation.

Keywords: Green vehicles, performance perception, consumer decision-making, electric mobility, battery efficiency, driving comfort, Kanyakumari District, sustainable transportation.

1. INTRODUCTION

The rapid growth of the global automotive industry has brought undeniable socioeconomic benefits, but it has also contributed significantly to environmental degradation through greenhouse gas emissions, noise pollution, and fossil fuel dependency. As a response to these challenges, the transition toward

green vehiclesincluding battery electric vehicles (BEVs), plug-in hybrid electric vehicles (PHEVs), and fuel-cell vehicleshas emerged as a critical strategy for promoting sustainable transportation. Green vehicles offer the potential to reduce carbon emissions, improve air quality, and decrease reliance on non-renewable energy sources. However, despite these benefits, their adoption remains inconsistent across different regions, often shaped by socioeconomic, infrastructural, and perceptual factors.

One of the most significant determinants influencing consumer adoption of green vehicles is vehicle performance perception. Performance perception encompasses a variety of functional attributes such as acceleration, top speed, driving comfort, handling stability, battery range, charging speed, and maintenance reliability. For consumers, especially in developing regions, the perceived ability of a green vehicle to meet every day driving needs plays a central role in purchase decision-making. Even when environmental awareness is high, if performance is perceived as inadequate, adoption rates are likely to remain low.

In India, government initiatives such as the Faster Adoption and Manufacturing of Hybrid and Electric Vehicles (FAME) scheme, tax incentives, and subsidies have aimed to accelerate EV penetration. However, the success of these initiatives is often moderated by local perceptions, particularly in semi-urban and rural districts where infrastructure is still developing. Kanyakumari District, located at the southernmost tip of Tamil Nadu, presents a unique case for examining consumer attitudes toward green vehicles. This district is characterized by a mix of urban center, coastal communities, and rural settlements, along with increasing environmental awareness due to its ecologically sensitive location. While the region has witnessed a gradual introduction of electric vehicles by both established Indian brands and new entrants, the market is still in its formative stage.

Performance perceptions in Kanyakumari are shaped by specific local realities. Limited charging infrastructure, road conditions, driving distances, and climatic conditions all influence how consumers evaluate the suitability of green vehicles. In addition, socioeconomic diversity means that purchase decisions are not solely driven by cost or environmental benefits; rather, they depend on whether the vehicle is perceived as reliable, efficient, and capable of delivering consistent performance. For example, battery range and charging time are critical considerations in rural areas where public charging facilities are scarce, while urban consumers may prioritize acceleration, comfort, and brand innovation.

The importance of perceived performance is further amplified by the fact that electric vehicles are still relatively new to the Indian mass market. Many consumers rely on indirect information sources such as peer recommendations, advertisements, and brand reputation rather than first-hand experience. This can lead to misconceptions both positive and negativeabout green vehicle capabilities. If manufacturers fail to bridge the gap between actual and perceived performance, adoption rates may remain stagnant despite financial incentives.

Understanding the interplay between performance perception and consumer decision-making is therefore essential for stakeholders. For manufacturers, it can guide product design and marketing strategies that emphasize verified performance metrics. For policymakers, it provides insights into targeted interventions, such as infrastructure improvements and awareness campaigns that address local concerns. For consumers, it can reduce uncertainty and build trust in sustainable mobility options.

Against this background, the present study investigates the influence of vehicle performance perception on consumer decisions for green vehicles in Kanyakumari District. Using a structured survey conducted with 110 respondents through convenience sampling, the research explores how performance-related factors such as battery efficiency, driving comfort, acceleration, maintenance reliability, and

technological innovation affect the likelihood of purchase. By focusing on a region with a diverse socioeconomic profile and emerging EV infrastructure, this study contributes to both academic understanding and practical policymaking in the domain of sustainable transportation.

2. STATEMENT OF THE PROBLEM

Despite the increasing global emphasis on sustainable transportation, the adoption of green vehicles in Kanyakumari District remains relatively modest, even as environmental awareness grows among its residents. While factors such as cost, infrastructure, and government incentives influence purchase decisions, consumers' perceptions of vehicle performance including battery efficiency, driving range, maintenance reliability, and overall technological advancement play a decisive role in shaping their willingness to invest in eco-friendly alternatives. However, limited empirical research has been conducted to understand how these performance perceptions specifically affect consumer decisions in the district's unique socioeconomic and geographic context, where urban and rural mobility needs differ significantly. This gap in understanding poses challenges for manufacturers, marketers, and policymakers aiming to design effective strategies that align with local expectations and accelerate the shift towards sustainable mobility.

3. REVIEW OF LITERATURE

❖ **Gupta (2024)** conducted a study on Indian consumers and found that key barriers to EV adoption include durability concerns, range limitations, and high upfront costs. The research highlighted that performance perception is often linked to the vehicle's ability to deliver consistent efficiency under diverse driving conditions. The study emphasized that integrating driver-friendly technology can improve user satisfaction and confidence. Additionally, offering customization options tailored to consumer preferences was found to enhance overall performance perception. These improvements collectively have the potential to significantly increase EV adoption rates.

❖ **Purwanto and Irawan (2024)** conducted a comprehensive review examining the factors influencing consumers' willingness to purchase electric vehicles. Their findings revealed that performance expectationsparticularly in terms of energy efficiency and emission reductionplay a central role in shaping consumer preferences. Environmental concerns further strengthen the inclination toward EV adoption. The study also identified infrastructure availability, such as charging station accessibility, as a critical enabler. Additionally, cost-related considerations, including purchase price and maintenance expenses, were found to significantly impact buying decisions.

❖ **Wang et al. (2023)** investigated trust in Battery Electric Vehicle (BEV) range estimation systems (RES) in China and found that range anxiety remains a concern despite technological advancements. Their study highlighted that trust in RES plays a crucial role in influencing consumers' charging decisions and travel planning. Accurate and reliable range estimation was identified as essential for enhancing performance perception and reducing user uncertainty. The findings emphasize that improving RES credibility can strengthen consumer confidence in BEVs. Overall, the research underscores the link between technological trust and EV adoption.

4. RESEARCH GAP

Although numerous studies have examined factors influencing electric vehicle (EV) adoption, much of the existing research is concentrated on developed markets or large metropolitan cities, where

infrastructure, consumer awareness, and brand exposure are relatively advanced. Limited empirical evidence exists on how vehicle performance perceptionincluding acceleration, range, reliability, and maintenance expectationsaffects consumer decisions in semi-urban and rural contexts like Kanyakumari District. Moreover, while prior studies have explored environmental concern, cost, and policy incentives, the role of performance perception intertwined with local socioeconomic conditions and infrastructure constraints remains under-explored. There is also a lack of studies capturing responses from a balanced mix of current vehicle owners and potential buyers in small districts, using primary data to understand ground-level adoption barriers and motivators. This gap necessitates targeted research to provide localized insights that can inform manufacturers, policymakers, and infrastructure planners.

5. OBJECTIVES OF THE STUDY

- To study how people's views on vehicle performance affect their decision to buy green vehicles in Kanyakumari District.
- To find the link between performance perception and interest in buying green vehicles.
- To identify main performance factors that encourage people from buying green vehicles.

6. RESEARCH METHODOLOGY

The study is descriptive in nature and focuses on understanding the influence of vehicle performance perception on consumer decisions for green vehicles in Kanyakumari District. Primary data was collected through a structured questionnaire from 110 respondents selected using a convenient sampling method. The questionnaire included sections on demographic details, performance perception factors, and purchase decisions.

Secondary data was obtained from journals, research articles, industry reports, and government publications to support the analysis. The data collected was analyzed using statistical tools such as percentage analysis, mean score ranking, and correlation analysis with the help of SPSS software. The findings were interpreted to identify the key performance factors influencing consumer preferences and to provide suitable recommendations for promoting green vehicle adoption.

7. RESULTS & DISCUSSION

- To study how people's views on vehicle performance affect their decision to buy green vehicles in Kanyakumari District.

This objective explores how consumers in Kanyakumari District perceive the performance of green vehicles. It aims to understand how these perceptions influence their decision to purchase such vehicles. The focus is on key performance factors like battery life, comfort, and reliability.

TABLE 1
VEHICLE PERFORMANCE AFFECT THEIR DECISION TO BUY GREEN VEHICLES
ANOVA Table

Source	df	F	Sig.
Regression	6	43.23	.000*
Residual	103		
Total	109		

Coefficients Table

Variable	Coefficient (B)	Std. Error	t-value	p-value	Interpretation
Constant	0.073	0.265	0.276	0.783	Not significant
Battery Life	0.41	0.04	10.213	0	Strong positive effect
Driving Comfort	0.227	0.04	5.669	0	Positive effect
Maintenance Reliability	0.179	0.04	4.423	0	Positive effect
Environmental Concern	0.131	0.04	3.265	0.001	Positive effect
Brand Reputation	0.281	0.04	6.992	0	Positive effect
Price Sensitivity	-0.11	0.037	-2.944	0.004	Negative effect (higher price sensitivity lowers intention)

Source: Computed Data

'*' Significant at 5% level

The regression results indicate that battery life perception has the strongest positive impact on consumers' intention to purchase green vehicles, followed by driving comfort, maintenance reliability, environmental concern, and brand reputationall showing significant positive effects. Conversely, price sensitivity negatively influences purchase intention, meaning that consumers more sensitive to price are less likely to buy green vehicles. The constant term is not significant, suggesting the model's predictors adequately explain purchase intention. Overall, improving vehicle performance features, strengthening brand reputation, and addressing price concerns are key to increasing green vehicle adoption.

➢ To find the link between performance perception and interest in buying green vehicles.

This objective aims to explore the relationship between how people perceive the performance of green vehicles and their interest in buying them. Understanding this link can help manufacturers and marketers improve strategies to encourage more green vehicle purchases.

TABLE 2

Group	N	Mean Purchase Intention	Std. Deviation	Std. Error Mean
High Performance Perception	55	4.45	0.48	0.065
Low Performance Perception	55	3.62	0.61	0.082

Source: Computed Data

People who have a high perception of vehicle performance show a higher average purchase intention (4.45) compared to those with a low perception (3.62). This suggests that better views on performance are linked to stronger interest in buying the vehicle. Also, the smaller standard deviation and error in the high perception group indicates their purchase intentions are more consistent.

TABLE 3

Levene's Test for Equality of Variances	**F**	**Sig.**	
	1.25	0.267	
t-test for Equality of Means	**t**	**df**	**Sig. (2-tailed)**
Equal variances assumed	8.15	108	.000
Equal variances not assumed	8.14	106	.000

Source: Computed Data

'*' Significant at 5% level

Levene's Test (F = 1.25, Sig. = 0.267): Since the p-value (0.267) is greater than 0.05, we assume equal variances between the two groups.t-test for Equality of Means (t = 8.15, df = 108, p = 0): The p-value is less than 0.05, which means there is a statistically significant difference in purchase intention between the high and low performance perception groups.People's purchase intentions are significantly higher when they perceive better vehicle performance.

- To identify main performance factors that encourages people from buying green vehicles.

This objective focuses on identifying the main performance factors that influence people's decisions to buy green vehicles. Knowing these factors can help improve green vehicle design and marketing.

TABLE 4

PERFORMANCE FACTOR

S.No	**Performance Factor**	**Garrett Score**	**Rank**
1	Environmental Impact	78.5	I
2	Battery Life	75.2	II
3	Safety Features	70.3	III
4	Driving Range	67.8	IV
5	Vehicle Speed	64.0	V
6	Charging Time	61.7	VI
7	Brand Reputation	58.9	VII
8	Maintenance Cost	54.6	VIII
9	Vehicle Price	50.1	IX

Source: Primary data

The Garrett ranking analysis reveals that Environmental Impact (78.5) is the most influential factor, indicating consumers' strong preference for eco-friendly vehicles, followed by Battery Life (75.2) and Safety Features (70.3), highlighting the importance of reliability and safety in purchase decisions. Driving Range (67.8) and Vehicle Speed (64.0) are moderately important, while Charging Time (61.7) and Brand Reputation (58.9) hold lower significance. Maintenance Cost (54.6) and Vehicle Price (50.1) rank the lowest, suggesting that operational efficiency and environmental benefits outweigh cost considerations in consumer preferences, reflecting a shift toward sustainability-focused and value-driven vehicle choices.

FINDINGS

❖ Battery life has the biggest positive effect on people's interest in buying green vehicles. Comfort, easy maintenance, caring for the environment, and brand reputation also help increase interest. But people who worry about the price are less likely to buy. Overall, improving these features and keeping prices reasonable can encourage more people to buy green vehicles.

❖ People who think green vehicles perform well have a higher average interest in buying them (4.45) than those who think performance is low (3.62). The variation in their responses is also smaller, meaning their opinions are more consistent. Since Levene's test shows equal variances and the t-test shows a significant difference ($p = 0$), we can say that the difference in purchase intention between the two groups is real and important. In short, better performance perception leads to stronger interest in buying green vehicles.

❖ The Garrett ranking analysis shows that *Environmental Impact* (78.5) holds the first rank, reflecting consumers' strong preference for eco-friendly vehicles, while *Vehicle Price* (50.1) occupies the last rank, indicating that cost plays a comparatively minor role in influencing purchase decisions.

SUGGESTIONS

✓ Improve Vehicle Performance Features – Manufacturers should focus on enhancing battery life, range, and overall driving comfort to strengthen consumer confidence.

✓ Affordable Pricing Models – Introducing flexible financing schemes, subsidies, or exchange offers can help overcome the barrier of high initial costs.

✓ Increase Awareness Campaigns – Conducting awareness programs highlighting the long-term savings, environmental benefits, and technological features of green vehicles can improve public perception.

✓ Strengthen Charging Infrastructure – Expanding fast-charging stations in urban and rural areas of Kanyakumari District will reduce range anxiety and encourage adoption.

✓ Offer Customization Options – Allowing customers to choose designs, colours, and additional features can enhance personal satisfaction and perceived value.

✓ Collaboration with Local Dealers – Partnering with local dealerships to provide test drives and performance demonstrations will help consumers directly experience the benefits.

✓ Introduce Extended Warranty and Maintenance Packages – Offering longer warranty periods and low-cost maintenance plans will build trust in product reliability.

✓ Promote Local Success Stories – Showcasing testimonials from existing EV owners in Kanyakumari District can influence hesitant buyers through relatable experiences.

✓ Government–Industry Partnerships – Collaborating with policymakers to provide tax benefits, registration fee waivers, and incentives for early adopters.

✓ Integration of Smart Technologies – Incorporating advanced features like AI-based driving assistance, regenerative braking, and real-time performance monitoring to enhance value perception.

CONCLUSION

The study on the Influence of Vehicle Performance Perception on Consumer Decisions for Green Vehicles in Kanyakumari District reveals that consumers' adoption of electric vehicles (EVs) is significantly shaped by their perceptions of performance factors such as driving range, speed, durability, charging efficiency, and technological features. While environmental benefits and long-term cost savings

act as motivating factors, concerns over range limitations, charging infrastructure, and high initial investment remain notable barriers. Findings indicate that enhancing vehicle reliability, integrating advanced driver-friendly technologies, and providing robust after-sales support can positively influence consumer confidence. Furthermore, targeted awareness programs and government–industry collaborations can play a crucial role in shifting perceptions and accelerating adoption. Overall, improving the performance image of green vehicles is essential to foster a sustainable and eco-friendly mobility culture in Kanyakumari District.

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