

Electric Vehicles in Karnataka: Consumer Insights and Trends

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Abstract: This research explores consumer perceptions and preferences towards electric vehicles (EVs) in the contemporary automobile market in Karnataka. Against the backdrop of a transformative shift in the automotive industry toward sustainable alternatives, particularly EVs, our study explores the multifaceted factors shaping individual choices. Through demographic analysis, we discern notable trends, including a generational shift in preference and a gender divide. The study unveils a high level of consumer awareness and a strong inclination toward EVs, emphasizing environmental considerations as key influencers in buying behavior. Factors such as cost savings, vehicle performance, and brand recognition play pivotal roles in shaping EV preferences. This research provides nuanced insights crucial for manufacturers, policymakers, and researchers navigating the dynamic landscape of the evolving EV market.

1 INTRODUCTION

The automotive industry is currently navigating a significant paradigm shift, driven by an imperative need to address the environmental impact of traditional fuel-based vehicles. In response to the escalating challenges posed by climate change, electric vehicles (EVs) have emerged as a promising and environmentally conscious alternative, presenting a pathway toward reduced carbon emissions and a sustainable future. This research aims to unravel the intricate tapestry of consumer perceptions and preferences surrounding EVs, offering insights into the multifaceted factors that influence individual choices within the dynamic landscape of the contemporary automobile market (Yang and Chen, 2021).

The urgency to combat climate change has propelled the global quest for sustainable transportation alternatives, as highlighted by the Intergovernmental Panel on Climate Change (IPCC) in 2018. Electric vehicles, characterized by their eco-friendly attributes, have gained prominence in this endeavor, aligning with international efforts to curtail carbon footprints and mitigate the environmental repercussions associated with traditional combustion engines (Bonsu, 2020). As governments worldwide incentivize electric mobility, understanding consumer attitudes becomes imperative for

manufacturers, policymakers, and researchers to effectively navigate this transformative phase (Kumar and Alok, 2020). A pivotal starting point in comprehending consumer preferences is the examination of demographic factors, acknowledging their influential role in shaping attitudes toward electric vehicles (Ahmad and Zhang, 2020). Age, gender, occupation, and income levels act as pivotal determinants, reflecting the diverse perspectives within the consumer base. The research identifies a pronounced interest in EVs among the 20-30 age group, suggesting a potential generational shift in preferences and a receptiveness to innovative and sustainable solutions. The survey also underscores a noteworthy gender divide, with more females expressing interest in green initiatives within the automobile industry, contributing to a richer understanding of the varied consumer landscape (Colmenares, Löschel, and Madlener, 2020).

The geographical distribution of respondents reveals a prevalence of urban representation, potentially influenced by superior charging infrastructure and heightened awareness. While suburban and rural areas exhibit lower representation, they play a critical role in unveiling accessibility challenges faced by distinct demographics, offering insights essential for creating inclusive and effective electric mobility strategies (Nevzorova and Kutcherov, 2019).

The investigation into current ownership patterns provides a snapshot of the existing EV landscape. Encouragingly, an overwhelming 83.3% of respondents already own electric vehicles, indicating a promising market penetration and the increasing acceptance of EVs (Rietmann and Lieven, 2019). However, the persistence of 16% relying on conventional automobiles signals potential challenges or reservations that merit further exploration (Lee et al., 2020).

Consumer awareness emerges as a critical dimension, with an impressive 80% of respondents demonstrating cognizance of EVs. This shift in public awareness signifies a positive trajectory toward greater acceptance and integration of electric vehicles into mainstream consciousness (Noel et al., 2019). Preferences lean substantially towards EVs (47.3%), followed by bi-fuel (36.7%) and CNG (16%), highlighting a growing interest in sustainable alternatives and a maturing understanding of diverse fuel technologies (Krishna, 2021).

1.1 Environmental Impact on Buying Behavior

Environmental consciousness emerges as a pivotal factor influencing buying behavior, with a considerable 32.7% of respondents considering the environment as a moderately influencing factor. Additionally, 28.7% rate it as a strong influence, underscoring the need for automakers to accentuate the eco-friendly aspects of their products in their marketing strategies (Jaiswal et al., 2021). This finding reflects a heightened awareness among consumers regarding the environmental impact of their choices, shaping the narrative for sustainable and eco-conscious automotive preferences (Shetty et al., 2020).

1.2 Factors Influencing EV Preferences

A nuanced exploration of factors influencing EV preferences reveals that cost savings, vehicle performance, and adaptability to future trends emerge as decisive elements. Notably, 38% of respondents consider all these factors collectively, emphasizing the need for automakers to align their strategies with consumer expectations for a holistic EV experience (Yang and Chen, 2021). The preference for specific EV models further emphasizes the diverse landscape of offerings in the market, with Tata Motors, Ather Energy, and Hyundai standing out as favored choices. Conversely, the relatively low preference for Ola's EV models (0.7%) suggests that brand recognition

and trust play pivotal roles in influencing consumer choices within the competitive EV market (Jaiswal et al., 2021).

In summation, this research aims to comprehensively explore and analyze consumer perceptions and preferences regarding electric vehicles in the contemporary automobile market. By navigating the intricate interplay of demographic, awareness, and preference factors, the study seeks to contribute valuable insights to industry stakeholders, policymakers, and researchers, guiding strategic decisions in the pursuit of a sustainable and consumer-centric electric mobility future.

2 RESEARCH METHODOLOGY

This quantitative study employed to analyze data on consumer perceptions and preferences regarding electric vehicles (EVs) in the contemporary automobile market of Karnataka. The research aimed to obtain a comprehensive understanding of various factors influencing consumer attitudes, demographic patterns, and key drivers or barriers to EV adoption. A random stratified sampling technique was applied to get a sample that fairly represents the population. The participants the study were the people who has diversity of jobs and socioeconomic backgrounds, varied in age from 18 to 60. The sample size of 150 respondents was determined based on statistical considerations to achieve a reliable representation of the population of Karnataka. The survey instrument, a structured questionnaire, was designed to capture quantitative data on a range of variables. Data collection was conducted through a questionnaire provided online platform to enhance accessibility and reach a broader audience. The survey was distributed using a combination of purposive and snowball sampling techniques, leveraging social media platforms, email lists, and online forums. The quantitative data obtained were subjected to rigorous statistical analysis. Frequencies, percentages, and measures of central tendency, were utilized to summarize demographic characteristics and provide an overview of the sample profile along with a graphical presentation.

3 RESULT AND ANALYSIS

Table 1: Profile of Respondents: Age, Gender, Occupation, Income, and EV Awareness.

Category	Subcategory	Respondents	Percentage (%)
Age	Below 20	50	33.34%
	20-30	88	58.66%
	31-40	2	1.40%
	41-50	7	4.60%
	Above 50	3	2%
Gender	Female	77	51.30%
	Male	73	48.70%
Occupation	Students	120	80%
	Business People	12	8%
	Government Officials	3	2%
	Employees	2	1.30%
	Homemakers	2	1.30%
Annual Income	Less than 10L-30L	67	47.50%
	30L-60L	5	3.50%
	60L-90L	3	2.10%
	Above 90L	4	2.80%
Residential Area	Urban	91	61.10%
	Suburban	16	10.70%
	Rural	42	28.20%
Automobile	Yes	103	68.70%
	No	47	31.30%
Awareness of EV	Yes	120	80%
	No	17	11.30%
	Maybe	13	8.70%

The demographic data shows a predominantly young, diverse, and economically varied group with a significant presence in urban areas. This demographic profile is crucial for understanding the current and potential future market for electric vehicles. The high awareness levels and diverse

income brackets suggest that electric vehicles are gaining traction across different segments of the population. Policymakers and industry stakeholders can leverage these insights to tailor strategies that cater to the preferences and concerns of specific demographic groups, ultimately fostering widespread adoption of electric vehicles.

Environmental friendliness being the primary reason (64.9%) indicates a strong alignment of consumer values with sustainable practices, suggesting that eco-conscious features are pivotal in driving EV adoption. This inclination towards environmental considerations reflects a broader societal trend where consumers are increasingly valuing products that contribute to a greener and more sustainable future. The data implies that consumers are making conscious choices to reduce their carbon footprint, and automakers emphasizing the eco-friendly aspects of electric vehicles could attract a larger audience.

Table 2: Challenges Hindering Electric Vehicle Adoption: Survey Insights.

Reasons for Not Preferring EV	Frequency	Percentage
Limited driving range	65	51.60%
Concerns about battery life	41	32.50%
High upfront cost	16	12.70%
Others	28	18.70%

The prominent concern of limited driving range (51.6%) highlights a key barrier, emphasizing the need for advancements in battery technology and charging infrastructure to address consumer apprehensions. Addressing this concern through technological advancements and a denser network of charging stations could alleviate hesitations and contribute to a more widespread acceptance of electric vehicles.

4 CONCLUSION

The findings illuminate critical facets of consumer attitudes towards electric vehicles (EVs), substantiating the evolving landscape of sustainable mobility. The high importance attributed to environmental friendliness (64.9%) aligns with literature emphasizing the role of environmental consciousness in shaping consumer preferences (IPCC, 2018). Conversely, the significant concern regarding limited driving range (51.6%) corroborates

existing studies underscoring range anxiety as a substantial barrier to EV adoption (Krishna, 2021). The positive trend of high EV ownership (83.3%) resonates with research highlighting the influence of positive ownership experiences on continued adoption (Bonsu, 2020). Preference for established brands like Tata Motors (43.2%) aligns with consumer trust literature (Li, 2023). These insights underscore the nuanced interplay between environmental consciousness, practical concerns, and brand trust in shaping consumer decisions, offering valuable considerations for policymakers, manufacturers, and marketers aiming to foster sustainable mobility practices.

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