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Exploring Customer Readiness Level and Preferences for Private Electric Passenger Cars in Kerala

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ABSTRACT

Decisions related to vehicle purchase are influenced by various factors including purchase price, total cost of ownership, fuel efficiency, maintenance cost, and resale value. In India, the dominance of fossil fuel-powered vehicles has led to several environmental and economic challenges. Increasing fuel prices not only strain individual budgets but also contribute to inflation, impacting the national economy. Consequently, renewable, reusable, and sustainable alternatives have become imperative. Electric vehicles (EVs), widely adopted in many foreign countries, offer a promising solution. This study focuses on understanding the customer perspective on the adoption of electric passenger cars in Kerala, aiming to uncover awareness levels, preferences, and barriers to adoption.

Keywords: Reasons for dissatisfaction in the current ownership-expectations-preferences- readiness level-reasons for the non- purchase.

INTRODUCTION

Electric mobility is emerging as a transformative force in global transportation, offering an environmentally friendly and sustainable alternative to internal combustion engine (ICE) vehicles. Although electric vehicles date back to the 1800s, their popularity diminished due to the practicality and dominance of ICE vehicles. With modern advancements, electric passenger cars—powered by batteries or alternative electric sources—are regaining prominence. This transition is gaining importance in India due to various promoting regulations and schemes of central government line FAME I &II. In alignment with the market of the country; the transition to electric vehicle adoption in Kerala is gaining momentum. Kerala is known for high literacy rate which causes to be for growing environmental consciousness and progressive consumer behaviour. The fluctuating fuel prices and government initiatives also give more pace to this change.

While the adoption rate of electric two wheelers shows a progressive trend, the adoption of electric passenger cars remains a moderate market suggest to have a study on understanding about the drivers or hindrances in the penetration which is very essential to the various stake holders like manufacturers, policy makers and the society at large.

Literature Review

Bappaditya Kar, Tarun Kanti Pal and Suvanjan Bhattacharyya in their article titled "Study of the Reality on Electric Vehicle in Indian Scenario" has analysed the pollution and environmental aspects of Electric Vehicles. They have analysed the CO2 emission of Electric Vehicle is compared the IC engine vehicles and also the time period to convert Electric vehicles in to Green Vehicles. They have included Lithium- ion Battery production, Sources of Electricity production in India, fuel production for ICV and performance and efficiency of EV in their study. **Dr. Makena Coffman, Dr. Paul Bernstein and Sherilyn Wee** has published a report titled "Factors affecting EV adoption: A literature review and EV forecast for Hawaii". The report has categorised the factors into two Internal and External which included battery costs, Purchase price, driving range, charging time under internal factors and fuel prices, policy incentives, consumer characteristics, availability of charging stations, travel distance, public visibility and vehicle diversity under external factors. **Volodymyr**

Bilotkach and Mike Mills in their paper on "Simple Economics of Electric Vehicles adoption" used Monocentric urban model, developed by Alonso and Mills and Multicentric model. They have studied the travel to leisure/shopping destinations and Vehicle ownership patterns but excluded the role of markets, and government support of Electric Vehicles. road congestion, property prices etc. which may trigger for another studies. **Zenhua Chen, Andre L Carrel, Christina Gore and Wei Shi** had written an article on "the Environmental and Economic impact of Electric Vehicle adoption in the U.S". They have taken 4 important variables of EV adoption such as BEV charging infrastructure, TCO, Vehicle Characteristics and preference and attitudes of consumers. Under TCO they considered purchase cost, Energy cost, Depreciation cost, insurance, maintenance and repair costs. Under purchase cost give the consideration for availability of subsidies, price incentives from manufacturers, productivity of battery manufacturing and the productivity of manufacturing of other vehicle components. **Mike Salisbury** under Southwest Energy Efficiency Project conducted a study and published on the title Economic and Air Quality Benefits of Electric Vehicles in Nevada. The study concentrated on how Electric Vehicles helps in job creation, provide economic benefits and Air quality benefits to the Clark and Washoe Countries and state of Nevada. The report says that EV

drivers can expect to save on fuel cost from $1000 to $ 1300 annually and this fuel savings will become additional disposable income that will be spent in the local economy which will create additional jobs in the state. By 2030, the total savings on fuel cost of Nevada is expected to be
$138 billion dollar per year. Report gives the following recommendations to be adopted in the policy such as Rebate for the purchase or lease of an EV, Installation of state-wide charging stations, allowing charging station owners to resell electricity to EV drivers; state wide charging station funding source, a registration fee which may contribute to the roadway maintenance cost and Expanded use of performance contracting to purchase EVs for Government fleets. **Zeinab Rezvani, Johan Jansson and Jan Bodin** has published a work on the Title "Electric Vehicles in India: Market Analysis with Consumer Perspective, Policies and Issues". They have considered the Indian EV market status, market players, policies, issues related with policy options and case studies on the consumer perspective in the study. The study advocates that, in order to attain the sustainability, Public Transportation like Buses, Autos and Taxi has to convert in to EVs. One of the barriers in the low adoption rate of EVs are the high purchase price in which Government initiatives in the area of Tax and subsidy could come in to handy. Infrastructure development for EVs is very important and measures should be taken to increase the awareness about the advantages of EVs. The report has studied in detail about the Indian passenger road transport system including technologies and clean mobility options, market landscapes of EV components, EV charging infrastructure, role of distribution utility, role of financial institutions and consumer perceptions, Central and state Level policies on e-mobility, different e-mobility models and key barriers in the adoption of EVs. **Zeinab Rezvani, Johan Jansson and Jan Bodin** have tried to describe the adoption behaviour of Electric vehicles by Customers in one their publication titled "Advances in Consumer Electric Vehicle adoption research: A review and research Agenda". The objectives of article were to have an overview of the drivers for and barriers against consumer adoption of plug in EVs and to identify the gaps and limitations in existing research and suggest a research agenda for the future. In order to attain the objectives; an extensive literature review and review of various theoretical framework of Consumer behaviour like Theory of Planned Behaviour and Rational Choice Theory, Value-Belief-Norms Theory etc. has been carried out. In order to understand the behaviour; different factors affecting behaviour like attitudinal factors, environmental factors, innovation adoption, emotional factors have been considered. The relationship between market share of Electric Vehicles, the presence of Government incentives and influential socio-economic factor affecting the adoption of Electric Vehicles in US has been identified and described in a

publication titled "Analysis of the Electric Vehicles Adoption over the United States" by **Ali- Soltani-Sobh, Kevin Heaslip, Aleksandar Stevanovic, Ryan Bosworth and Danilo Radivojevic.** The study used Macroscopic Logit Market Share Model has been used to demonstrate mode choice decisions, Time series data of EV statistics, cross section studies and Panel Data Regression Model to include un measured explanatory variables in the time series and cross section studies. **Till Gnann, Thomas S. Stephens, Zhenhong Lin, Patric Plotz, Chang Zheng Liu** has done the review of the 40 international PEV market diffusion papers in their article titled "What drives the market for plug- in electric vehicles? A review of international PEV market diffusion models. The papers have revolved around the purchase price, energy prices, operating costs, charging infrastructure, policy measures, BEV range as the main influencing factors.

Statement of the Problem

Even though customers of Kerala are progressive thinking customers and environment conscious, the low adoption

rate of electric passenger cars is a field of study. The adoption rate of electric passenger cars is influenced by various factors like awareness, perception, economic aspects, technological aspects, environmental aspects of electric cars. The infrastructure facilities also play a significant level in the penetration of electric cars. There is a lack of information focussed on attitudes, preferences, concerns and readiness level of consumers regarding electric car purchase. This study tries to explore and analyse the preferences, expectations, hindrances and readiness level of the potential customers of Kerala.

Objectives of the Study

1. To identify the underlying reasons behind the dissatisfaction, if any, among present car owners.
2. To explore customer expectations and preferences.
3. To examine the readiness level of customers toward e-car adoption.
4. To identify reasons for non-purchase at this stage.

METHODOLOGY

The researcher has mainly employed primary data for this study. A survey using a structured questionnaire was conducted among 200 potential car buyers from across Kerala state. Secondary data were collected from scholarly articles, websites, and industry reports.

Table 1 Table showing Residential status of respondents

Residential Status		
Area	No. of Respondents	In percentage
Urban	112	56
Rural	88	44
Total	200	100

Primary data

Table 2 Table showing Gender wise classification of respondents

Distribution based on Gendeer		
Gender	No. of Respondents	In percentage
Male	164	82
Female	36	18
Third Gender	0	0
Total	200	100

Primary Data

Table 3 Table showing fuel used by existing cars of respondents

Fuel Used by Cars		
Type of Fuel	No. of Respondents	In percentage
Petrol	156	78
Diesel	16	8
CNG	12	6
Electric	16	8
Hydrogen	0	0
Total	200	100

Primary Data

Table 4 Table showing reasons behind the dissatisfaction with existing cars

Reasons for dissatisfaction with Existing car		
Reasons	No. of Respondents	In percentage
High fuel cost per travel	108	54
High service and maintenance cost	46	23
Delay in & Poor quality of Service	30	15
Inadequate no of charging stations	0	0
Delay in home charging installation	0	0
Others (please specify) Low Ground Clearance	16	8
Total	200	100

Primary Data

Table 5 Table showing sources of forming needs and expectations of respondents

Base of forming need and expectations about Electric Cars	No of Respondents	In Percentage
Word of mouth from relatives/friends	112	56
Through Advertisement	56	28
Self-interest	32	16
Incentives	0	0
Total	200	100

Primary Data

Table 6 Table showing Preference of respondents

Preference of needs in the adoption of E-Cars							
Needs	Ranks					Total	Weighted
	1	2	3	4	5		Value
Reaping Economic Advantages of E-cars	84	72	32	8	4	200	824
Environmental Aspects of E-Cars	68	76	32	20	4	200	788
Craze for new technology/new product	40	32	80	32	16	200	664
Others (Please Specify.....)	0	0	0	0	0	0	0
Weights given to Ranks: Rank 1-5; Rank 2-4; Rank 3- 3; Rank4-2 Rank 5-1							

Primary Data

Table 7 Table showing ranking of Preference of respondents

Ranking expectations from Market/Institutions/Authorities/Companies/Brands													
Expectations	Ranks												Weighted
	1	2	3	4	5	6	7	8	9	10	11	12	13	Value

A car which can purchase with Low budget	1456	144	88	320	0	72	64	32	28	72	0	0	0	2276
More models of Cars in Categories of Cars	312	672	352	80	120	0	64	0	28	24	0	104	0	1756
Less Insurance Cost	260	240	484	120	0	108	96	192	0	120	72	24	0	1716
Less Battery Cost	728	240	484	440	200	0	0	64	28	24	0	0	0	2208
Exemptions of Road Tax and Registration fee	312	240	572	200	320	180	64	64	28	24	12	8	0	2024
Discounts/incentives from Govt.	260	528	132	80	200	216	0	32	168	120	72	0	0	1808
Discounts/incentives from car companies/dealers	156	96	396	80	80	324	192	160	0	120	12	48	0	1664
Adequate Charging Stations	208	240	220	160	360	0	128	96	84	192	0	24	8	1720
Working Charging Stations	160	384	0	80	200	288	96	256	252	0	12	8	0	1836
Fast charging Stations	468	0	396	360	80	216	64	64	56	144	36	0	0	1884
Availability of Spare parts	156	432	88	320	80	36	256	64	168	0	108	0	0	1708
Adequate &quality service stations	260	240	132	0	360	0	192	96	0	72	96	64	0	1512
Others (Please Specify)	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Primary Data

Weights given: Rank 1-13, Rank 2-12 to Rank 13-1

Table 8 Table showing Readiness level of respondents in adopting E-cars

Readiness Level of Customers in the E-Car Adoption		
Readiness Level	No of Respondents	In Percentage
I am a current owner of an electric car	16	8
I am planning to buy an electric car soon.	12	6
I am considering purchasing an electric car, although I haven't decided on the timing yet.	0	0
I have considered buying an electric car but decided to hold off for now.	164	82
I am interested in converting my current vehicle into an electric car.	8	4
Total	200	100

Primary Data

Table 9 Table showing reasons for Limited acceptance of E-cars

Reasons for not Purchasing at this stage		
Reasons	No of Respondents	In Percentage
High Purchase price	108	54
High Battery Replacement cost	60	30
Inadequate knowledge of advantages of Electric cars	32	16
Total	200	100

Primary Data

Key Findings

Demographics and Vehicle Usage

- 82% of respondents were male; 56% from urban areas.
- Petrol is the dominant fuel type (78%), while 8% use electric cars.

Dissatisfaction with Current Vehicles

- 54% cited high fuel costs as the main issue.
- 23% were concerned about high service and maintenance costs.

Needs and Preferences

- Major motivation for considering EVs was economic advantage (412 weighted value), followed by environmental concerns (394).
- Word of mouth (56%) and advertisements (28%) were key influencers.

Expectations from Stakeholders

Top expectations included:

- Affordable purchase price (2276 weighted value)
- Reduced battery costs (2208)
- Road tax and registration exemptions (2024)
- More charging and fast-charging stations (1720–1884)

Readiness and Barriers to Adoption

- 82% have considered purchasing but decided not to proceed currently.
- 54% cited high purchase price, 30% battery replacement cost, and 16% inadequate knowledge as barriers.
- Only 8% already own electric cars.

Implications

Government and automobile manufacturers need to reassess their strategies. While environmental concerns are significant, economic incentives play a more decisive role in influencing consumer behaviour. Therefore, policy makers should prioritize making EVs more cost-effective by reducing taxes, offering subsidies, and investing in charging infrastructure. Additionally, awareness programs highlighting long-term benefits and debunking myths about EVs can improve adoption rates.

CONCLUSION

This study presents a nuanced understanding of consumer perspectives regarding electric passenger car adoption in Kerala. It reveals that while awareness is high, adoption is hindered by cost-related concerns and inadequate knowledge. By addressing these barriers and emphasizing the economic viability of EVs, stakeholders can accelerate the transition toward sustainable mobility. Future research should extend this analysis to other districts and states to form a comprehensive policy framework for widespread EV adoption in India.

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