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Problems Faced by the Consumers While Buying and Using the Electric Two Wheeler in Thrissur District, Kerala, India

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Authors' contributions

This work was carried out in collaboration among between both authors. Both authors read and approved the final manuscript.

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ABSTRACT

Aim: The study aimed to identify the problems faced by the consumers while buying and using the electric two wheeler.
Methodology: Data required for the study were collected from primary and secondary sources. The primary survey were conducted among the respondents through a pre-structured interview schedule during the month of May 2023. Secondary data were collected from websites, government reports and publications. A total of 30 respondents who are using electric vehicles were selected from Thrissur, using a random sampling method. The identified problems of consumers while buying and using electric vehicle are ranked by making use of Garrett's Ranking Technique.

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Results: Based on Garrett's ranking, it can be seen that the major problems faced by the consumers while buying electric vehicle were high vehicle cost and the major problem faced by the consumers while using were lack of service centers and followed by lack of skilled labor (breakdown & maintenance).
Conclusion: The results of this study will aid marketers in understanding the problems of consumers. Understanding this would give marketers the ability to create and carry out their marketing strategies effectively, giving them a stronger competitive edge.

Keywords: Electric two wheeler; problems; high vehicle cost; lack of service centers and skilled labor Garrett's ranking.

1. INTRODUCTION

Everything is transported by vehicle, it is essential to be aware of vehicle pollution. 87% of India's CO_2 equivalent emissions of the transport sector come from road transport [1]. The sources of air pollution in the areas are numerous, but the transportation division makes a critical commitment. The negative impact of air quality on human health and the economy is well known. Even the increased use of fossil fuels in transportation and industry negatively impacts air quality. These driving forces are also to blame for the increase in background noise. The number of vehicles on roads and pollution also increased. So the best choice to reduce vehicle pollution is to use electric vehicles. Electric vehicles are being introduced by India's automobile industry as a solution to the industry and environment [2]. Among the electric vehicle, electric two wheeler are growing in popularity every day. An electric two-wheeler refers to a vehicle that is equipped with an electric motor to assist with or replace pedaling. The global electric two-wheeler market size reached US$ 35.3 Billion in 2022. Expects the market to reach US$ 72.5 Billion by 2028, exhibiting a growth rate (CAGR) of 13.18% during 2023-2028. The production of electric vehicles and their related components is anticipated to increase the share of manufacturing in GDP to over 24% by 2022-23 [3]. According to the Society of Manufacturers of Electric Vehicles Sales of electric two-wheelers in India surged to 8,46,976 units in 2022-23 [4], a more than two-and-a-half-fold increase from the previous year's figure of 3,27,900 units. In India, efforts to introduce electric two-wheelers began in the 1990s. Electric two-wheelers were initially created by companies like Bajaj Auto, Scooters India Ltd etc. During the years 2010 to 2012, the Ministry of New and Renewable Energy (MNRE) provided electric vehicle subsidies (Niti ayog). According to government data compiled by Clean Mobility Shift from the Vahan Dashboard, just 72,930 newly registered four-wheeled electric vehicles occurred in India in 2023. Even though this is nearly twice as many as in 2022, the South Asian country's transition to e-mobility is mostly concentrated on two-wheelers.

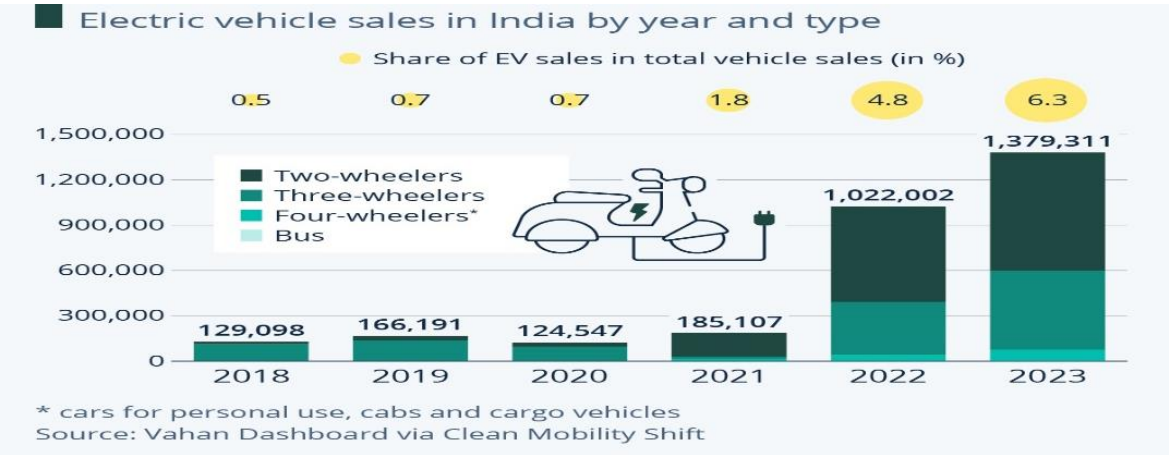

Fig. 1. Electric vehicle sales in India by year and type
Source: Statista

From the above bar chart it indicates most of the people were concentrating on electric two wheelers and in 2023, the market share of electric vehicles was 6.3% and about 1379311 electric two-wheelers were sold out. From 2018-2023 the share of EV sales in total sales electric vehicle were increasing.

Kerala is one of the first state in India, which declare its e-mobility policy (Economic review 2021). The state ranks second in the spread of electric two-wheelers that do not cause air and noise pollution. The e-two-wheeler market in the state has increased by 13.66 percent compared to other states. In 2022, it was 6.28 percent. In 2022, 33,438 e-two wheelers were registered in the state.

In the current scenario, EVs have an essential role in combating climate change globally by helping to cut emissions and reducing dependence on fossil fuels. If there is a 100% electric vehicle, 50 to 75% pollution is reduced. Now, people in Kerala are interested in buying and knowing about electric vehicles. So there is a need to study problems faced by the consumers while buying and using the electric two wheeler. This study will be helpful to the manufacturers in understanding the problems faced by the consumers while buying and using electric vehicle. Thereby being able to make appropriate modifications in the price, product, promotion and distribution of electric vehicles among consumers.

2. LITERATURE REVIEW

Egbue and Long [5] conducted a study on “Barriers to widespread adoption of electric vehicles: An analysis of consumer attitudes and perceptions” in Missouri. Primary data from 481 respondents were gathered. They determined if sustainability concerns affect consumers' decisions to buy electric vehicles and highlighted potential socio-technical impediments to consumer adoption of EVs. The survey offers insightful information on the tastes and viewpoints of technology enthusiast’s people closely connected to technological advancement and better able to distinguish between the numerous distinctions between conventional and electric vehicles.

Francis and Rinil [1] analyzed the behaviour of the energy efficiency of an Electric Vehicle (EV) in Kerala (India), considering factors such as environmental conditions and traffic conditions. They discovered that each sample contains various interesting characteristics, which are then studied by correlation to determine those that influence the EV's energy efficiency. The analysis found that as battery technology improves, fossil fuel prices rise, and electric vehicle technology becomes more cost-effective, there will be an increase in government subsidies and tax breaks for EVs in the near future.

Kumar and Padmanaban [6] conducted a study on “Electric Vehicles for India: Overview and Challenges”. Mainly secondary data were used for the study. The study found that a battery eco-system must be created to support numerous businesses and start-ups engaged in the production of battery packs and cells. To solve range anxiety, charging infrastructure needs to be constructed properly. Swapping possibilities should also be investigated. Making all government buses electric and providing tax advantages for private EV owners are essential ways to generate demand.

Gabhane et.al. [7] conducted a study on “Multivariate analysis of the factors influencing consumer’s purchase decision towards electric vehicles (Evs) in Maharashtra, India”. The study conducted among 150 individuals through structured interviews. They identified factors like astechnological, environmental, economic, infrastructural and multivariate analysis is used to identify the importance of each factor in purchase decision. The study found that economic aspect is the most important factor in the adoption of EV, followed by environmental, technological and infrastructural factor.

Hiremath et.al [8] studied on a study on consumer buying behaviour towards electric vehicles in Bagalkot. Primary data is collected through structured questionnaire from 100 respondents. The study found that the majority of respondents were familiar with the vehicle models Hero and Ather, and that new trends and a favourable impact on the environment are what motivate respondents to purchase electric vehicles. This study revealed that most of the customers are in the age category of 36-45.

Kumar et.al [9] made an attempt to study on consumer behaviour on electric vehicles in India. They used YouTube as a source for data collecting, and the data was then evaluated using a variety of methods, including sentiment analysis and data clouds. The study revealed that overall perception about the electrical vehicles in the country is positive and there is lot of scope for improvement and growth for

electrical vehicles industry in the country. Other than Electrical vehicles offer lot of advantages over conventional petrol or diesel vehicles.

Ranjan et.al [2] conducted a study on consumer buying behaviour towards electric vehicle. Both primary and secondary data were used. They located 65 responders from India. According to the study's findings, the majority of people who are leaning towards purchasing an electric vehicle are concerned about the pollution created by internal combustion engines and wish to preserve the environment. It was also discovered that the price of refuelling an electric vehicle is considerably lower than that of a petrol or diesel vehicle.

Sreekumar et.al [10-11] conducted a study on "An analysis of the socio-economic factors affecting the acceptance of electric vehicles in Kerala with special reference to Trivandrum". There are 120 participants in the study, with a balanced representation of men and women. Utilising Google Forms, a well-structured questionnaire was distributed in order to gather the information. They discovered that growing fuel prices and the benefits to the environment were the main variables that encouraged individuals to purchase electric cars. Other technical barriers to purchasing electric vehicles were found to include a lack of infrastructure, protracted charging times, and restricted range.

3. MATERIALS AND METHODS

Data required for the study were collected from primary and secondary sources. The primary survey were conducted among the respondents through a pre-structured interview schedule during the month of May 2023. Secondary data were collected from websites, government reports, and publications. A total of 30 respondents who are using electric vehicles were selected from Thrissur, using a random sampling method. For the purpose of analysis Garrett's ranking technique was used to rank the preference mentioned by the respondents on different problems.

4. RESULTS AND DISCUSSION

Kerala, known for its environmental sensitiveness, biodiversity and tourist attractions wishes to maintain its texture and ensure a sustainable development for its people. The transition to electric vehicles is a natural choice for the state in line with its development ethos. As per the FAME INDIA Scheme (Faster Adoption and Manufacturing of Electric Vehicles) of the Government of India and the approval of the Electric Vehicle policy of Government of Kerala, ANERT is planning to introduce E Vehicles and charging stations all over Kerala. For this purpose, ANERT has introduced a new scheme for providing electric vehicles to Government Departments on Lease/ Hiring. The sale of electric vehicles (EV) is soaring up in Kerala. As per data, 39,540 EVs were registered across the state in 2022, while the numbers were only 8,701 in 2021. In 2020, a total of 1,325 EVs were registered in the state. (Mathrubhumi.com) Kerala- Target of bringing 1 million EVs to the state by 2022, the state aims to pilot a fleet of 200,000 two-wheelers, 50,000 three-wheelers, 1,000 goods carriers, 3,000 buses and 100 ferry boats. Keeping in the view of policy of the Electric Vehicles of the Government of Kerala that by 2022, 10 Lakh fleets in Kerala will be electrical for the reason of its being environmental friendly, cost effective and substitute for fossil fuels. State Government Departments are encouraged to switch over to electrical Mobility from Petrol or Diesel cars in respect of vehicles taken on lease/ hire for official purpose. According to the Ministry of Skill Development and Entrepreneurship (MSDE), the EV industry could add 10 million direct jobs by 2030 which would create 50 million indirect jobs in the sector. Among EV electric two wheeler have very important role. The global electric two-wheeler market size reached US$ 35.3 Billion in 2022 [12].

Even though there were a lot of benefits to the electric vehicles, especially the electric two wheeler consumers have to suffer some problems while buying and using the vehicle. Their problems were analysed by using their response. The problems faced by the consumers while buying and using the electric vehicle is depicted in Table 1.

From Table 1 based on ranks, it can be seen that the major problem faced by the consumers while buying electric vehicle were high vehicle cost. The price of electric two wheeler are high compared to than conventional vehicle. The problem faced by the consumers while using were lack of service centers and followed by lack of skilled labor (breakdown & maintenance). Because labors are not much aware about electric vehicle and the marketers are not offering services [13].

Table 1. Problems faced by the consumers while buying and using the electric vehicle

Sl.no	Issues	Average Score	Rank
1	High vehicle cost	64	1
2	Lack of service centers	62	2
3	Lack of skilled labor(breakdown & maintenance)	57	3
4	Low mileage of the vehicles	51	4
5	Long recharging time	50	5
6	Supply chain problems	49	6
7	No clarity in government policies	48	7
8	Unawareness about maintenance and servicing	46	8
9	High electricity charge	41	9
10	Insufficient charging stations	38	10

Data source: Primary data

5. CONCLUSION

The popularity of electric two-wheelers is rising. NITI Aayog aims to achieve EV sales penetration of 70% for all commercial cars, 30% for private cars, 40% for buses and 80% for two and three-wheelers by 2030. This is in line with the goal to achieve net zero carbon emission by 2070. The sales of electric two-wheelers (E2W) in overall two-wheeler sales have already reached more than 3%, the share of registered electric three-wheelers (E3W) in total three-wheeler sales have surpassed 50%. The trend is forecast to keep pace with the current growth with a projected CAGR of 49.79%, leading to annual sales of 191.5 lakh EVs by FY 2030 (as per JMK Estimates). E-two wheelers alone will account for more than 80% of total EV sales by FY 2030. The results of this study will aid marketers in understanding the problems faced by the consumers while buying and using the electric vehicle. This would give marketers the ability to create and carry out their marketing strategies effectively, giving them a stronger competitive edge. The government should make it their priority to promote the use of electric vehicles in Kerala as they are environment friendly. Awareness campaigns and advertisements about the various incentives and benefits associated with electric vehicles should be popularized through all media platforms. Companies should offer better post-purchase services with skilled labours. The government should partner up with the private sector and contribute men, material and financial resources for promoting the production and research& development associated with electric vehicles.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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APPENDIX

In the study, respondents rank on different problems were convert them into score values and ranking with the help of the following formula:

Percent position = 100 (Rij-0.5)/ Nj

Where Rij = Rank given for the Ith variable by jth respondents Nj = Number of variable ranked by jth respondents With the help of Garrett's Table, the percent position estimated is converted into scores by referring to the table given by Garret and Woodworth (1969). Then for each factor, the scores of each individual are added and then the total value scores and mean values of the score are calculated. The factors having the highest mean value is considered to be the most important factor.

Table A 1. High vehicle cost for different parameters

High vehicle cost		Insufficient charging stations	Low mileage	Unawareness about maintenance and servicing	Lack of service centers	Lack of skilled labor	No clarity in government policices	Supply chain problems	Long recharging time	High electricity charge
82		18	37	30	43	48	53	58	63	70
30		18	37	43	53	58	70	82	63	70
63		70	37	30	58	53	48	43	82	18
82		63	48	58	70	53	30	37	43	18
70		82	63	58	48	53	43	30	37	18
82		18	37	30	43	48	53	58	63	70
30		18	37	43	53	58	70	82	63	70
82		18	70	37	63	58	30	53	48	43
63		30	18	70	82	58	48	53	43	37
82		18	37	30	43	48	53	58	63	70
30		18	37	43	53	58	70	82	63	70
63		70	37	30	58	53	48	43	82	18
82		63	48	58	70	53	30	37	43	18
70		82	63	58	48	53	43	30	37	18
82		18	37	30	43	48	53	58	63	70
30		18	37	43	53	58	70	82	63	70
82		18	70	37	63	58	30	53	48	43
63		30	18	70	82	58	48	53	43	37
82		70	53	37	63	58	43	48	18	30
18		30	37	43	82	48	70	63	58	53
63		58	53	48	70	82	43	37	30	18
82		18	70	63	37	53	58	48	43	30
53		37	70	63	82	58	48	43	18	30
58		37	63	53	82	70	43	48	43	30
63		43	58	48	70	82	37	30	53	18
70		30	82	43	63	53	48	18	58	37
82		**18**	**70**	**37**	**58**	**63**	**48**	**43**	**53**	**30**
53		**48**	**70**	**58**	**82**	**30**	**18**	**37**	**63**	**43**
58		**43**	**63**	**48**	**70**	**82**	**53**	**18**	**30**	**37**
70		**37**	**82**	**53**	**63**	**48**	**43**	**58**	**18**	**30**
Total	1920	1139	1539	1392	1848	1701	1442	1483	1495	1214
Average	64	37.96666667	51.3	46.4	61.6	56.7	48.06666667	49.43333333	49.83333333	40.46666667
Rank	1	10	4	8	2	3	7	6	5	9

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