

ELECTRIC VEHICLE OWNERSHIP IN KERALA: INSIGHTS ON BRAND CHOICE, COSTS, USAGE, AND USER CHALLENGES

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ABSTRACT

Despite the rising adoption of electric vehicles (EVs) as an environmentally sustainable alternative, customer satisfaction remains a critical concern. This study explores the ownership patterns, brand preferences, cost considerations, and usage behaviour of electric vehicle (EV) users in Kerala, along with the key challenges they face. Despite increasing adoption, users report significant issues viz; a lack of charging stations, face long waiting times, and experience battery-related maintenance concerns. Additionally, the customers struggle with a lack of skilled technicians and face extended repair times. These challenges highlight gaps in infrastructure and after-sales support. The study underscores the importance of improving charging accessibility, maintenance services, and technical expertise. The insights gained aim to assist policymakers,

manufacturers, and service providers in enhancing the EV ownership experience and accelerating the shift toward sustainable mobility in Kerala.

Keywords: Electric vehicles, environmental advantages, Brand preferences, Charging infrastructure, Maintenance charges.

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1. Back Drop

The global automotive industry is at the forefront of a technological and environmental revolution, with electric vehicles (EVs) emerging as a sustainable alternative to traditional internal combustion engine vehicles. Rising concerns over climate change, urban air pollution, and the depletion of fossil fuels have positioned EVs as a critical component in achieving global climate goals and promoting cleaner mobility solutions (International Energy Agency [IEA], 2023). However, while the environmental advantages of EVs are well-documented, their market success increasingly hinges on consumer satisfaction.

Customer satisfaction in the EV sector is multifaceted, encompassing aspects such as vehicle performance, design, affordability, reliability, and after-sales service. Notably, EVs offer unique advantages such as quieter operation, instant torque, and lower operational costs, all of which contribute to a positive user experience. A recent survey by *Consumer Reports* (2023) found that 85% of EV owners expressed satisfaction with their vehicle's performance, underlining the growing acceptance and enthusiasm surrounding this technology. Historically, the concept of electric mobility dates to the early 19th century, but it is only in the last two decades—spurred by innovations in battery technology and increasing environmental awareness—that EVs have gained mainstream traction. In India, the EV movement gained momentum with the launch of the Reva electric car in 2001, marking a significant milestone in the country's shift toward clean mobility.

Kerala has emerged as a frontrunner in EV adoption. The state's proactive policy initiatives, infrastructure development, and consumer awareness have contributed to rising satisfaction levels among EV users. Cities like Thiruvananthapuram are seeing accelerated

uptake, thanks to the availability of charging infrastructure and local government support. This study seeks to examine the various dimensions of customer satisfaction with EVs in Kerala, focusing on factors such as performance, affordability, and infrastructure. By exploring the perceptions of EV users, the research aims to provide actionable insights for stakeholders to further enhance adoption and user experience.

2 Literature Review

The transition to electric vehicles (EVs) has become a global imperative in response to growing environmental concerns and the need for sustainable transportation. Chan (2002) emphasizes the critical role of batteries, noting that EVs are considered green solutions due to their potential to reduce environmental impact. The effectiveness and cost of EV batteries significantly influence their adoption. Hadley and Tsevtoka (2008) highlight regional differences in the impact of EV charging on electricity demand, pointing out that increased penetration may necessitate substantial capital investments by utilities.

Kurani et al. (2009) delve into consumer behaviour, revealing confusion about plug-in hybrid electric vehicles (PHEVs) and their operations. They stress the importance of consumer education to bridge knowledge gaps. Dow et al. (2010) suggest using time-of-use (TOU) rates to encourage off-peak charging, which can help manage electricity demand more efficiently. From an environmental standpoint, Neumann et al. (2010) argue that the proliferation of EVs is essential for future energy security and reducing CO₂ emissions.

Caperollo and Kurani (2011) identify confusion about battery usage, lack of charging infrastructure, and reluctance to adopt new technologies as barriers to EV adoption. Gyimesi and Viswanathan (2011) add that understanding significantly affects consumers' willingness to pay for EVs, with knowledgeable consumers more inclined to invest in the technology. Egbue and Long (2012) reinforce this, citing technological unfamiliarity and uncertainty as primary deterrents to widespread EV adoption.

Axsen et al. (2012) associate EV adoption with pro-environmental and technologically open lifestyles. Carley et al. (2013) underscore the importance of driving range, showing a preference for PHEVs over battery electric vehicles (BEVs) due to range concerns. Similarly, Tamor et al. (2013) conclude that PHEVs may be more acceptable to consumers, particularly in regions like Minneapolis, because of their cost-efficiency and adaptability to trip chaining.

Cahill et al. (2014) find that EV consumers generally receive less satisfactory service at dealerships compared to buyers of conventional vehicles, indicating a need for better dealer training and consumer education. Larson et al. (2014) emphasize that familiarity enhances consumers' valuation of EVs. The Consumer Federation of America (2015) demonstrates a strong correlation between EV knowledge and positive consumer attitudes, suggesting the need for widespread awareness campaigns.

Rezvani et al. (2015) explore adoption from various behavioural perspectives, highlighting individual, technological, and social influences. Sabri et al. (2016) note that dual-mode HEVs have played a significant role in the development of PHEVs. Liao, Molin, and van Wee (2017) offer a comprehensive review, illustrating that both economic factors like cost and driving range and psychological factors like consumer awareness shape EV preferences. They stress the effectiveness of policies such as tax reductions and the importance of charging station density.

Jin and Slowik (2017) acknowledge early EV market growth but identify barriers such as cost, range limitations, and low consumer awareness. Mohamed et al. (2018) focus on the Indian context, identifying opportunities like government initiatives and battery development, while highlighting challenges including cost, efficiency, and demand. Gujarathi, Shah, and Lokhande (2018) warn that India's dependence on fossil fuels necessitates an urgent shift to EVs, which can reduce pollution and economic reliance on imported oil.

Masurali (2018) observes that consumer education significantly enhances awareness and acceptance of EVs in India. Pretty Bhalla (2018) concludes that car choice is influenced by multiple factors including environmental concern, cost, and infrastructure, suggesting a combined effort from government and manufacturers to enhance EV acceptance. Kumar (2019) discusses India's National Electric Mobility Mission Plan 2020 and stresses the importance of robust planning and infrastructure to overcome challenges such as range anxiety and cost.

Kesari (2019) calls for aggressive government strategies to promote EVs, particularly through public procurement and investments by fleet operators. Aggarwal (2019) points out that while EVs are more feasible for short-distance travel, issues such as battery weight hinder their performance in two-wheelers. Sierzchula et al. (2014) provide a cross-country comparison showing that incentives and infrastructure play key roles in adoption, with policy combinations proving most effective.

Hardman et al. (2017) distinguish between early adopters and mass-market consumers, noting the need for information dissemination to tackle consumer hesitancy. Gnann et al. (2015) model EV adoption as an S-curve, stressing long-term policy consistency. Javid and Nejat (2017) examine psychological and social determinants, suggesting social campaigns can significantly influence adoption.

Nicholas and Hall (2018) analyze California's ZEV program, highlighting the success of combined regulatory and financial incentives. Wang et al. (2019) focus on China, identifying government support and reliable charging options as key drivers. Noel et al. (2019) emphasize the influence of peer networks, proposing community-based EV trials to promote adoption.

Wolinetz and Axsen (2020) argue for aggressive policy interventions to overcome consumer inertia and infrastructure biases. Lutsey et al. (2020) underline disparities in adoption rates, with strong policy backing in countries like Norway and China yielding better results. Krupa et al. (2020) conduct a behavioural study revealing that EV purchase decisions are influenced by a complex mix of financial, social, and environmental factors, necessitating tailored promotional strategies.

This vast literature reviewed indicates that while EVs hold great promise for sustainable transportation, several barriers impede their widespread adoption. Key issues include technological limitations, cost, range anxiety, lack of infrastructure, and consumer awareness. Effective policy frameworks, public education, and incentives, along with supportive infrastructure and behavioural interventions, are essential to drive the transition toward electric mobility. The Indian context adds further complexity with its unique challenges and opportunities, requiring targeted strategies to promote acceptance and usage of electric vehicles across diverse demographics.

3. Statement of the Problem

Despite the rising adoption of electric vehicles (EVs) as an environmentally sustainable alternative, customer satisfaction remains a critical concern. Challenges such as inadequate charging infrastructure, limited driving range, high upfront costs, and uncertainties regarding long-term reliability continue to hinder the overall ownership experience. Compared to traditional vehicles, EV buyers often report lower satisfaction levels. This study aims to explore and analyse the key factors influencing customer satisfaction with EVs and identify the primary

drivers and barriers. The insights gained will help improve customer satisfaction and promote broader acceptance of electric mobility.

4. Importance of the Study

This study is significant as it explores key problems faced by the consumers in the emerging electric vehicle (EV) market in India, a key factor influencing adoption. Understanding customer experiences and expectations can help manufacturers improve EV design, performance, and reliability. Satisfied customers drive word-of-mouth promotion, enhancing brand trust and market growth. The insights from this study can guide companies in aligning their offerings with consumer needs and support policymakers in framing effective incentives and infrastructure development. Ultimately, the study contributes to promoting EV adoption, reducing emissions, and supporting India's environmental and sustainable transportation goals.

5. Objectives of the Study

The specific objectives of the study are:

1. To evaluate the brand preference of EV customers.
2. To assess customer features based on their years of ownership, cost and use of EVs.
3. To evaluate the problems and challenges regarding owning and maintaining EVs.
4. To make actionable recommendations based on the finding of the study.

6. Scope of the Study

This study focuses on the key factors influencing customer satisfaction with electric vehicles (EVs) in India. It examines aspects such as vehicle performance, charging infrastructure, cost of ownership, environmental benefits, and technological advancements. The study aims to assess how these factors shape consumer perceptions and influence adoption decisions. It also considers the broader impact of EVs on sustainability and resource management. While primarily centered on user experiences and expectations, the study provides insights that can support manufacturers, policymakers, and stakeholders in improving EV offerings and promoting wider acceptance of eco-friendly transportation solutions.

7. Methodology

The present study is descriptive and analytical in nature, focusing on customer satisfaction among electric vehicle (EV) users in Kerala. The population comprises all EV users within the state, with a sample of 100 respondents selected specifically from the Thiruvananthapuram district. A convenience sampling method was employed to select participants. Both primary and secondary sources of data were utilized; primary data were collected directly from respondents through a well-structured questionnaire, while secondary data were obtained from books, newspapers, and journals. For data analysis and inference, simple statistical tools such as percentages and averages were applied.

8. Data Analysis and Discussion

8.1. Sample Profile of Respondents

Variable	Classification	Frequency	Percentage
Gender	Male	42	42
	Female	58	58
Age	18-25	64	64
	26-35	14	14
	36-45	12	12
	46-55	10	10
Occupation	Govt Employee	34	34
	Pvt. Employee	42	42
	Student	24	24
Monthly Income (IRS)	Below 20,000	42	42
	20,000-50,000	18	18
	50,000-1,00,000	16	16
	Above 1,00,000	24	24
Area of Residence	Urban	46	46
	Semi	30	30
	Rural	24	24

Table 1 illustrates the gender-wise distribution of the respondents. Out of a total of 100 participants, 58% were female, while only 42% were male. This indicates a higher level of female participation in the study, suggesting either a greater interest in the topic among women or higher accessibility or willingness to respond to surveys related to electric vehicles (EVs). This trend may offer insight into the growing influence of women in consumer decision-making in the automotive sector, traditionally dominated by male consumers. Table 1 presents the age-

wise classification of respondents. A significant majority, 64%, fall within the 18–25 age group, indicating that the survey captured a largely youthful demographic. An additional 26% represent the middle-aged group. This skew toward younger respondents may reflect the segment most actively engaged with or open to the concept of sustainable transportation, as younger generations often demonstrate higher environmental awareness and technological adaptability.

The employment status of respondents, also illustrated in Table 1, shows that private sector employees constitute the largest group at 42%. Students represent 34%, while government employees account for the remaining 24%. The predominance of private sector employees may suggest greater financial independence and disposable income, which influences their preference for EVs. Private employees are likely drawn to EVs due to their lower operating costs and the availability of government incentives, which enhance affordability—particularly attractive to those with steady income streams. Table 1 further analyses respondents based on their monthly income. The data reveals that the highest number of respondents (42%) earn below ₹20,000 per month, suggesting a substantial representation of low-income individuals in the sample. This is followed by 24% of respondents earning more than ₹100,000 monthly, reflecting the presence of a high-income segment. The income brackets ₹20,000–₹50,000 and ₹50,000–₹100,000 are represented by 18% and 16% respectively. This diverse income spread indicates a notable income disparity among respondents. The predominance of low-income respondents could imply that affordability remains a critical factor in EV adoption, necessitating targeted subsidies and financing options to increase accessibility for this segment.

The location-wise distribution, as seen in Table 1, shows that 46% of respondents are from urban areas, followed by 30% from semi-urban and 24% from rural regions. The majority urban representation highlights that EV awareness and adoption are more prevalent in cities, where better infrastructure, higher income levels, and more robust promotional campaigns are typically present. Conversely, the relatively lower participation from rural areas suggests a potential gap in EV outreach and infrastructure, indicating a need for more inclusive policy measures and infrastructure expansion beyond urban centres.

8.2. Brand of EV used.

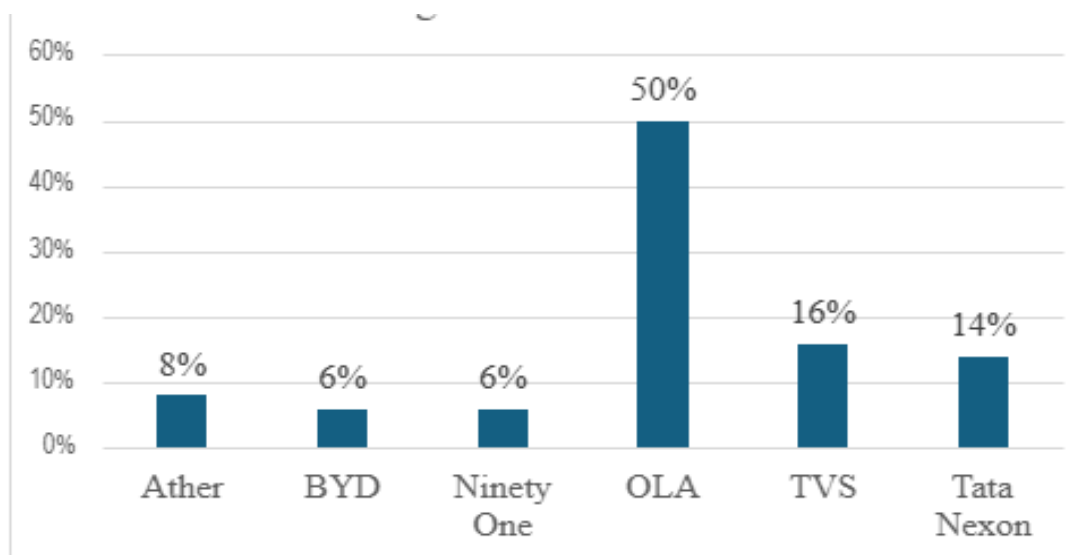


Fig. 1: Brand Preference of EVs

Figure 1 highlights the brand-wise distribution of electric vehicle ownership among respondents. Ola emerges as the market leader, commanding a dominant 50% share. This substantial lead suggests Ola's strong market penetration, likely driven by its aggressive pricing strategy, appealing design, and integration of smart technology, which resonates well with cost-conscious and tech-savvy consumers. TVS holds the second position with 16%, followed by Tata Nexon at 14%. TVS's popularity could be attributed to its established reputation in the two-wheeler segment and its wide dealership network. Tata Nexon's position reflects the growing demand for electric cars in India, particularly among those seeking reliability and a larger vehicle segment. Ather, known for its innovation and premium features, captures 8% of the market. Despite a smaller share, Ather's presence indicates a niche but growing preference for performance-focused and technology-rich EVs among early adopters and urban consumers. BYD and ninety-one, each accounting for 6%, show emerging interest in lesser-known or newer brands. Their presence, though limited, reflects a diversification in consumer choices as more brands enter the Indian EV market with competitive offerings.

This distribution reveals a clear consumer inclination toward affordable, smart, and urban-friendly electric vehicles, with Ola securing a stronghold due to its value-driven and accessible offerings. The diversity among brands suggests an evolving market where price, performance, design, and innovation are key decision-making factors. The data also implies that

as awareness and infrastructure grow, consumers are likely to explore beyond dominant players, leading to a more competitive and dynamic EV landscape in the future.

8.3. Cost of EV owned

Table 2 Cost of EV owned by respondents

Cost	Respondents	Percentage
Below 100000	5	5
100000 – 500000	72	72
500000 – 1000000	7	7
Above 10,00,000	16	16
TOTAL	100	100

The table 2 presents the distribution of respondents based on the cost of their electric vehicles (EVs). A significant majority, 72% of respondents, reported purchasing EVs priced between ₹1,00,000 and ₹5,00,000. This clearly indicates a strong preference for mid-range EVs, which offer a balance between affordability and essential features. This segment likely includes popular two-wheelers and entry-level electric cars, making it a dominant choice among average income consumers. A smaller proportion, 16%, have invested in premium EVs priced above ₹10,00,000. This reflects a segment of high-income or brand-conscious consumers who prioritize advanced technology, performance, brand value, or vehicle size—commonly seen in high-end electric cars like those from BYD or Tata's premium models. 7% of the respondents reported EVs costing between ₹5,00,000 and ₹10,00,000, indicating a niche group opting for more feature-rich models without crossing into luxury pricing. Interestingly, only 5% of the respondents reported owning EVs costing below ₹1,00,000, suggesting that ultra-low-cost EV options are either limited in availability or less preferred, possibly due to concerns about quality, range, and reliability.

8.4. Year of Purchase

Table 3: Year of Purchase of EV by respondents

Year of Purchase	Respondents
2018-2019	6
2019-2020	32
2020-2021	46
2021-2022	16
TOTAL	100

Table 3 reveals that most of EVs were purchased during the period 2020-21. In this period, EVs gained popularity among the consumers influencing their purchasing behaviour.

8.5. Average monthly use of EV in Km

Table 4 Average monthly use of EV in km

Avg monthly use	Percentage
Below 100km	7
100 - 500km	67
500 - 1000km	21
1000 - 1500km	5
Above 1500km	0

The data shows that most respondents (67%) use their electric vehicles for 100–500 km per month, indicating moderate usage patterns likely aligned with daily commuting and short-distance travel. 21% use their EVs for 500–1000 km monthly, suggesting higher usage—possibly for longer commutes or frequent intercity travel. A small segment, 5%, reported usage between 1000–1500 km, reflecting more intensive or commercial use. Only 7% use their EVs for less than 100 km per month, indicating minimal usage—perhaps by occasional users or those with multiple modes of transport. Notably, no respondents reported usage above 1500 km, which implies that long-distance travel is not yet common among EV users, possibly due to range limitations or charging infrastructure constraints.

8.6. Problems and challenges

(i). Issue on charging EV

Table 5 Issues while charging EV

Issues	Percentage
Lack of charging stations	72
Inconsistent charging speeds	34
Broken or out-of-order chargers	6
Long waiting times	56
Charging cost variability	8

Table 5 shows that Lack of Charging Stations (72%) is the most common issue, affecting nearly three-quarters of respondents. It highlights that there is Inadequate charging infrastructure, especially in semi-urban and rural areas, difficulty finding conveniently located or publicly accessible stations and a major barrier to widespread EV adoption, contributing to

range anxiety. As the case of Long Waiting Times, over half of users reported excessive waiting times at charging points, which could result from too few chargers relative to the number of EVs, Slow charging speeds, leading to backlogs and lack of reservation systems or queue management which undermines the efficiency and convenience that EVs promise.

(ii). Maintenance issues with EV

Table 6 Maintenance issues with EV

Issues	Percentage
Software updates	44
Battery issues	54
Tire wear	14
General maintenance (e.g., brakes/fluids)	34

The problems related to the maintenance of EVs is depicted in table 6. Battery-related problems are the most frequently reported maintenance issue. This reflects user concerns about Battery degradation over time, Charging inconsistencies, Range fluctuations and High replacement costs. Since the battery is the most expensive and critical component of an EV, these concerns significantly affect customer satisfaction and long-term confidence.

Nearly half of the respondents (44%) face challenges related to software updates—this could include Bugs or glitches, Update failures, Inconvenience or downtime during updates. As modern EVs are heavily software-driven (e.g., for navigation, battery management, infotainment), poor software support can degrade the user experience. Out of the total 34% raised General Maintenance issue. This includes routine upkeep like brakes, fluids, suspension, etc. While EVs generally require less frequent maintenance than traditional vehicles, this finding shows that standard wear-and-tear remains a concern—especially when coupled with lack of technician availability. Tire issues are the least reported, but still notable. EVs tend to be heavier due to battery weight, which can cause faster tire wear, especially under aggressive driving or poor road conditions.

(iii). Challenges faced with EV maintenance

Table 7 Challenges faced by EV users in maintenance

Challenges	Percentage
High maintenance costs	38
Lack of skilled technicians	56
Long repair times	48
Limited availability of spare parts	36

Lack of Skilled Technicians (56%) is the most reported challenge, indicating a serious skills gap in EV maintenance services. The specialized nature of EV systems—particularly battery management, software, and power electronics—requires trained professionals, which are currently in short supply. Nearly half of the respondents (48%) experience extended delays in getting their EVs repaired. This could be linked directly to the technician shortage and the limited availability of spare parts, leading to longer turnaround times for service. Though EVs generally have fewer moving parts than internal combustion engine vehicles, costs can still be high due to expensive components (like batteries), limited-service centres, and proprietary technologies that require brand-specific service. Limited Availability of Spare Parts is a major issue reported by 36% of respondents. A substantial number of users report difficulty accessing replacement parts, indicating supply chain issues or inadequate distribution networks. This also contributes to repair delays and higher costs.

9. Observations and Findings

9.1. About Demographic

- **Gender Distribution:** Female respondents dominate the sample (58%), indicating growing female interest and influence in EV purchasing decisions, a shift from traditional male dominance in automotive sectors.
- **Age Group:** Majority (64%) are young adults (18–25), showing strong interest among younger, environmentally conscious, and tech-savvy consumers. Middle-aged respondents make up 26%, indicating moderate interest in older demographics.
- **Occupational Profile:** Private sector employees form the largest group (42%), likely due to stable incomes and financial independence enabling EV purchase. Students (34%) and government employees (24%) follow, reflecting mixed income and interest levels.

- **Income Levels:** 42% of respondents earn below ₹20,000 monthly, highlighting a significant low-income segment. 24% earn over ₹100,000, indicating presence of high-income EV buyers. Income disparity suggests affordability is a key factor for many potential buyers.
- **Location:** Urban residents dominate (46%), followed by semi-urban (30%) and rural (24%). This suggests greater EV awareness and infrastructure in cities, with rural areas lagging.

9.2. **About EV Brands Preference:** Ola leads the market with 50% share, reflecting success in affordability, technology, and urban appeal. TVS (16%) and Tata Nexon (14%) follow, showing demand for established brands and a mix of two-wheelers and cars. Smaller shares for Ather, BYD, and Ninety-One indicate a diversifying market.

9.3. **About Cost of EVs:** Majority (72%) own mid-range EVs priced ₹1–5 lakh, mostly affordable two-wheelers or compact cars. Premium EVs above ₹10 lakh represent 16%, showing niche high-end market. Very low-cost EVs (< ₹1 lakh) are rare (5%), likely due to concerns over quality or availability.

9.4. **About Year of Purchase:** Most purchases happened between 2020–21, reflecting recent growth in EV adoption.

9.5. **About Monthly Usage of EVs:** Most users (67%) travel 100–500 km/month, suitable for daily commuting. Limited long-distance travel suggests current EVs are mainly for urban or short-range use.

9.6. Problems and Challenges

- i. **Charging Infrastructure Issues:** The predominant challenge for EV users is the lack of sufficient charging stations (72%), which severely limits convenience and accessibility. Long waiting times at existing stations (56%) further exacerbate this problem, leading to user frustration. Additionally, inconsistent charging speeds (34%) affect the predictability of charging sessions. Although issues like charging cost variability (8%) and faulty chargers (6%) are less common, they still contribute to an overall negative charging experience.
- ii. **Maintenance Concerns:** Battery-related issues top the maintenance concerns (54%), indicating the critical importance of battery health and longevity for EV users. Software updates (44%) also present notable challenges, reflecting the growing

complexity of EV systems. General maintenance tasks such as brakes and fluids (34%) remain relevant, while tire wear is less significant (14%).

- iii. **Maintenance Service Challenges:** A major barrier in EV upkeep is the lack of skilled technicians (56%), which slows down repairs and increases downtime. Long repair times (48%) frustrate users who depend on their vehicles for daily use. High maintenance costs (38%) and limited availability of spare parts (36%) further complicate EV ownership, potentially deterring prospective buyers.

10. Suggestions for Improvement

- (i). **Enhance Targeted Marketing:** Leverage the strong female interest by creating campaigns that highlight EV benefits tailored for women, emphasizing safety, convenience, and environmental impact. Engage the youth demographic with digital marketing and social media promotions showcasing technology and sustainability.
- (ii). **Focus on Affordability:** Introduce more financial incentives, subsidies, and flexible financing options targeting low-income buyers, making EV ownership accessible across income groups.
- (iii). **Expand Rural Outreach:** Invest in awareness programs and infrastructure development in semi-urban and rural areas to close the urban-rural gap in EV adoption.
- (iv). **Strengthen Charging Infrastructure:** Scale up urban and suburban charging facilities, ensuring availability matches growing demand. Develop fast-charging stations to enable longer trips, encouraging more frequent and extended EV use.
- (v). **Diversify Product Range:** Encourage manufacturers to offer a wider variety of EV models, especially affordable entry-level vehicles and mid-range cars suited to diverse customer needs. Promote electric two-wheelers and compact cars to attract urban commuters and students.
- (vi). **Leverage Brand Strengths:** Ola and other market leaders should continue innovating to maintain dominance. Emerging brands can capture niche markets by focusing on unique features, technology, or luxury segments.
- (vii). **Promote Usage Versatility:** Address range anxiety by improving battery technology and educating consumers about realistic EV use cases. Incentivize higher mileage use through battery leasing, maintenance plans, or charging discounts.

- (viii). **Expand and Upgrade Charging Infrastructure:** To address the shortage of charging stations, authorities and private companies should accelerate the installation of widespread, accessible charging points, especially in urban and semi-urban areas. Reducing wait times can be achieved by increasing the number of chargers per station and introducing reservation systems. Additionally, standardizing charging speeds and maintaining equipment quality will improve user experience.
- (ix). **Enhance Battery and Software Support:** Manufacturers should focus on improving battery durability and warranty policies to build consumer confidence. Providing remote and easy-to-access software updates can reduce maintenance-related downtime. Consumer education about proper battery care and software use should be emphasized.
- (x). **Develop Skilled Workforce and Service Networks:** To overcome the shortage of skilled technicians, training programs and certification courses should be established to increase the number of qualified EV service professionals (Biju S K and Rajan J B, 2015a &b). This will help reduce repair times and improve service quality.
- (xi). **Improve Spare Parts Availability and Reduce Costs:** Establishing a reliable supply chain for spare parts will ensure timely repairs. Incentives for local manufacturing of EV components could reduce costs. Transparent pricing and standardized service packages might also help in reducing the overall maintenance cost burden on users.

11. Conclusion

The survey highlights strong interest in electric vehicles (EVs), particularly among younger, urban, and female consumers. However, challenges like limited charging infrastructure, long charging times, high upfront costs, and maintenance concerns persist. Environmental and cost-saving benefits are key motivators, though issues like battery range and service availability remain. For customers, it's essential to consider long-term benefits, take advantage of government incentives, and prioritize reliable after-sales support. Engaging with the EV community and testing models can lead to more informed choices. Dealers and manufacturers must focus on improving infrastructure, expanding service networks, and addressing customer concerns about charging and maintenance. Innovations in battery performance and charging speed will be key to making EVs more affordable and efficient. In conclusion, while EV adoption is growing, overcoming these barriers will accelerate the

transition to sustainable transportation. Continued efforts from all stakeholders will shape the promising future of EVs.

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