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DRIVING THE FUTURE: UNVEILING CONSUMER PREFERENCES AND PURCHASE INTENTIONS FOR ELECTRIC VEHICLES IN JALANDHAR

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ABSTRACT

This research explores consumer awareness, behavioral intent, and the impact of demographic variables on the adoption of electric vehicles (EVs) in Jalandhar, Punjab, while also analyzing the region's EV-related infrastructure and policies. A descriptive-analytical research design was used, combining both primary and secondary data. Primary data was gathered from 300 respondents using a structured Google Form questionnaire and analyzed using MS Excel and SPSS v25, applying Chi-square tests to test four hypotheses. Findings show that 74.6% of respondents earning above ₹80,000 intend to buy EVs, while only 36% of those earning below ₹20,000 do. Education was a significant factor, with 76% of Doctorate/Professional degree holders showing intent to purchase EVs. Age also influenced behavior: 74.3% of respondents aged 26–35 expressed purchase intent, the highest among all age groups. Regarding awareness, 98 respondents ranked social media as their top information source, far exceeding the expected average of 27.27 per source, with a Chi-square value of 290.72 ($p < 0.05$), confirming unequal consumer reliance across media. Secondary data revealed Jalandhar's current infrastructure is underdeveloped, with minimal public charging points despite Punjab's EV policy aiming for 25% EV registrations by 2027 and supporting 10,000 charging stations across the state. Challenges include inadequate charging access, high initial EV costs, and limited EV-trained technicians, while opportunities lie in battery-swapping models, state subsidies (up to ₹30,000 per EV), and a youth-driven urban market. The study concludes that while awareness and interest in EVs are growing, successful adoption in Jalandhar depends on bridging infrastructure gaps, improving policy execution, and aligning local initiatives with consumer readiness and preferences.

Keywords: Electric Vehicles (EVs), Consumer Behavior, EV Adoption in Jalandhar, Demographic Influence, Sustainable Mobility.

1.INTRODUCTION

The introduction and quick uptake of electric cars (EVs) is causing a transformational change in the worldwide automotive sector. As environmental deterioration, fossil fuel depletion, and climate change become more pressing issues, electric vehicles (EVs) have become a viable substitute for internal combustion engine (ICE) vehicles. Globally, nations are establishing aggressive goals to lower carbon emissions and improve energy security through the promotion of zero-emission automobiles. India, a significant automobile industry and one of

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the fastest-growing countries, has also welcomed this change with state-level laws to encourage EV use and national initiatives like FAME (Faster use and Manufacturing of Electric Vehicles).

India's adoption of electric vehicles is still somewhat low in comparison to world leaders like China, the US, and Europe, despite regulatory support and technological breakthroughs. Consumer adoption is impacted by psychological, sociological, and demographic aspects in addition to economic and technological ones. Therefore, it is essential to comprehend customer knowledge, preferences, and hurdles in order to accelerate the adoption of EVs, particularly in Tier-II towns like Jalandhar.

There is a lot of room for growth in the EV market in Jalandhar, a Punjab city that is quickly urbanising. Consumer intent towards electric transportation, infrastructural preparedness, and local knowledge are still not well understood, though. In contrast to urban areas with more developed EV infrastructure, places like Jalandhar pose particular difficulties, including as a dearth of models and public charging stations, as well as ingrained attitudes towards petrol and diesel cars.

Therefore, the purpose of this study is to investigate Jalandhar residents' purchasing patterns, awareness levels, and intentions regarding electric vehicle purchases. It also looks at how demographic factors like age, income, and education affect people's decisions to adopt EVs. Additionally, the study examines how different information sources like social media, family and friends, television, periodicals, etc. affect the development of consumer awareness.

This study provides a thorough understanding of the electric car ecosystem in the Jalandhar setting by fusing secondary insights from government publications, regulatory documents, and industry data with primary data from a sample of 300 respondents. It is anticipated that the information will help dealers, manufacturers, and legislators develop focused plans to increase EV adoption in smaller cities.

2. REVIEW OF LITERATURE

Long et al. (2019) investigated the evolution of consumer awareness and understanding of electric vehicles (EVs) in Canada over a four-year period. The study focuses on Canadian new vehicle buyers, analyzing changes in their awareness and understanding of EVs between 2013 and 2017. It examines factors such as recognition of EV models, understanding of EV technology, and exposure to charging infrastructure across different provinces. Cross-sectional survey analysis was done where data was gathered from 2,922 respondents in 2013 and 1,808 respondents in 2017. Collected data was analysed using a comparative analysis to identify trends and changes in consumer awareness and understanding of EVs over time. Findings showed that in both 2013 and 2017 Canadian new car consumers' awareness of EVs was still low and stable. Key electric vehicle models were "heard of" by a larger percentage of respondents in 2017, but both groups' knowledge and experience remained low. Both years' surveys revealed persistent customer misunderstanding, with approximately three-quarters of respondents unsure of how to charge electric cars and how they vary from hybrids. The study concludes that persistent lack of awareness may hinder market growth and limit the potential climate benefits associated with increased EV adoption.

Mahal and Patil (2021) aimed to explore the current trends, challenges, and consumer perceptions regarding electric vehicles (EVs) in India, particularly in light of rising fossil fuel prices and environmental concerns. The purpose of the study is to assess the compatibility and ease of adoption of EVs among Indian consumers and to understand their expectations and concerns. The primary data was collected using a descriptive research methodology, from

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a sample of 212 respondents through an online questionnaire. The collected data were analyzed using descriptive statistics and the Chi-square test to examine associations between consumer variables and their intention to adopt EVs. The findings revealed that although there is growing awareness of the environmental benefits of EVs with 37% respondents favouring eco-friendly vehicles a significant portion of the population remains unsure or unconvinced due to high upfront costs, limited charging infrastructure, and range anxiety. Furthermore, the study highlighted the need for better consumer education, favorable government policies, and targeted marketing strategies to promote adoption. The study concluded that while India holds strong potential for EV adoption, its success depends on coordinated efforts between manufacturers, policymakers, and consumers to overcome technical, economic, and infrastructural challenges.

Parmar and Pradhan (2021) conducted a study to assess consumer perception, awareness, and willingness to adopt electric vehicles (EVs) in Vadodara city amidst growing environmental concerns and government initiatives promoting sustainable transportation. The research adopted a descriptive survey design, incorporating both primary and secondary data sources. Primary data was collected from a sample of 100 respondents aged 18 to 55 through both online (Google Forms) and offline surveys, using random, convenience, and quota sampling methods. A structured questionnaire featuring dichotomous, Likert scale, and ranking-type questions served as the primary instrument for data collection. The collected data was analysed using chi-square tests to assess the statistical significance of consumer preference for EVs. The findings revealed that a majority of respondents preferred electric cars over two-wheelers, recognized environmental benefits, and associated EVs with features such as low noise, positive environmental impact, and modern appeal. However, the chi-square test results led to the acceptance of the null hypothesis, indicating that EVs were not significantly preferred over conventional vehicles by the sample population. The study concluded that while awareness of EVs is growing, actual preference and readiness to switch remain limited, highlighting the need for improved incentives, infrastructure, and consumer education to promote EV adoption.

Zhao (2024) analysed the public awareness of new energy vehicles in the United States and China. The main purpose of this paper is to compare public awareness of new energy vehicles in the United States and China, analyze the reasons for differences, and suggest strategies to improve public awareness in both countries. The study utilizes data from consumer surveys conducted by academic institutions and industry organizations in both countries. The research compares recognition of advantages/disadvantages, attitudes towards government policies, influences of cultural values, and media publicity across the American and Chinese public. Findings showed that consumer in China is more aware of EVs than the American consumers. Consumers in the U.S are not well-informed on fundamental features like charging time and driving range. On the other hand, Chinese customers may not fully comprehend technical concepts and auxiliary facilities, but they are better knowledgeable about the environmental benefits and regulatory support for EVs. These awareness levels are greatly influenced by media coverage and cultural variances. The study concludes that in comparison to China U.S. needs stronger education, infrastructure, and policy efforts to boost acceptance of EVs.

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3. RESEARCH METHODOLOGY

3.1 NEED AND SIGNIFICANCE OF THE STUDY

- Growing Significance of Electric Vehicles (EVs): EVs are essential for attaining environmental sustainability and cutting carbon emissions. EV adoption is a national priority in India due to the country's rising energy demands and urban pollution.
- Consumer Behaviour as a Key Determinant: Consumer perception, awareness, and intention continue to be the most important factors influencing the adoption of EVs, even in the face of technological improvements and regulatory assistance. Research on how personal preferences influence the EV market, especially in Tier-II cities, is scarce.
- Jalandhar has been designated as a Strategic Focus City for the targeted development of electric mobility under the Punjab State EV Policy (2022–2027). Because to Jalandhar's growing population, urbanisation, and vehicle density, customised EV measures are required. Current infrastructure and awareness levels are relatively underdeveloped, offering a relevant case study.
- Closing the Urban-Rural EV Research Gap: The majority of India's EV research is focused on major cities like Mumbai, Bengaluru, and Delhi. By concentrating on a developing city like Jalandhar, where infrastructure and consumer behaviour vary, this study provides regional representation.
- Assisting with Industry Decisions and Policy Implementation: Knowledge gained from this study can help local government entities improve infrastructure plans, awareness campaigns, and incentive programs. Local consumer expectations can be met by automakers and dealerships through the alignment of their product offerings and promotional activities.
- Environmental and Economic Implications: Promoting EVs in Jalandhar promotes India’s broader environmental goals, including reduction in automobile emissions and fossil fuel dependency. Economic potential includes the establishment of jobs in the fields of battery recycling, charging station development, and EV maintenance.

3.2 OBJECTIVES OF THE STUDY

- To evaluate the extent of consumer awareness regarding various information sources about electric vehicles.
- To examine the influence of demographic factors (such as age, income, and education) on consumer purchase intentions toward electric vehicles.
- To analyze the current trends, government policies, and infrastructure development related to electric vehicles in Jalandhar region.

3.3 HYPOTHESIS

H_{o1}: There is no significant difference in consumer reliance on different information sources.

H_{o2}: There is no significant association between a respondent’s age and their intention to purchase an electric vehicle.

H_{o3}: There is no significant relationship between monthly income and purchase intention towards electric vehicles.

H_{o4}: Education level has no significant impact on the intention to buy an electric vehicle.

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3.4 RESEARCH DESIGN

A descriptive and analytical research design is used in this study to examine Jalandhar consumers' behaviour, awareness, and purchase intentions with regard to electric vehicles (EVs). It uses primary and secondary data to assess correlations between variables, characterise patterns in attitudes, and produce insightful interpretations.

3.5 SCOPE OF THE STUDY

The study is limited to Jalandhar city, a rapidly growing urban area in Punjab, identified under the state EV policy as a focus city for electrification.

1. **Topical Scope:**
    - Consumer awareness and attitudes toward electric vehicles.
    - Demographic influence (age, income, education) on EV adoption.
    - Policy and infrastructure assessment through secondary sources.
2. **Time Frame:** The study was conducted over a 12-month period from July 2024 to July 2025, incorporating data collection, literature review, and analysis.
3. **Practical Scope:**
    - Policymakers in evaluating policy effectiveness at the city level.
    - Automobile manufacturers and marketers in designing targeted campaigns.
    - Academicians and researchers studying green mobility trends in semi-urban regions.

3.6 COLLECTION OF DATA

1. **For Primary Data Collection:**

- Instrument Used: A structured questionnaire circulated through Google Forms, pre-tested for reliability and clarity.
- Sample Size: 300 respondents from Jalandhar city, selected using stratified random sampling to ensure diverse representation by age, gender, income, and education.
- Tools Used:
    - MS Excel for tabulation
    - SPSS v25 for statistical analysis (Chi-square test)

2. **For Secondary Data**

Secondary data was sourced from:

- Government portals (NITI Aayog, MoRTH, MNRE)
- Punjab EV Policy (2022–27)
- Industry reports (CEA, IEA, SIAM)
- Academic journals, articles, and EV manufacturer websites
- Published EV sales data and infrastructure status reports (2023–25)

The secondary data supplemented the primary analysis by providing macro-level policy insights, infrastructure status, and national vs regional adoption trends.

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PRIMARY DATA SAMPLE CALCULATION

Hypothesis 1:

H_{01}: There is no significant difference in consumer reliance on different information sources.

Step 1: Observed Frequencies (O)

Table 1: Showing Source of Information

Source of Information	**Observed (O)**
Social media	98
Family/Friends	56
EV News & Media Outlets	38
Manufacturer Websites	28
Television	26
Salesperson	14
Mobile Text Messages	10
Posters	7
Magazines	6
Reference Groups	5
Newspapers	12
Total	**300**

(We'll use only the Ranked 1st data for simplicity in Chi-square)

Step 2: Expected Frequencies (E)

Assuming equal preference for all 11 sources:

E = Total Respondents / Number of Sources

=300/11

=27.27

Step 3: Apply Chi-square Formula

$X^2 = \sum(O-E)^2 / E$

Table 2: Calculation of Chi-square

Source	**O**	**E**	**$(O-E)^2 / E$**
Social media	98	27.27	179.35
Family/Friends	56	27.27	31.10
EV News	38	27.27	4.23
Manufacturer Site	28	27.27	0.02
Television	26	27.27	0.06
Salesperson	14	27.27	6.46
Text Messages	10	27.27	10.94
Posters	7	27.27	14.98
Magazines	6	27.27	16.88
Reference Groups	5	27.27	18.13
Newspapers	12	27.27	8.57
Total x^2			**290.72**

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Step 4: Degrees of Freedom & Critical Value

- df = k – 1 = 11 – 1 = 10
- At α = 0.05, critical value of x^2 (from table) = 18.31

Based on the results of your Chi-square test:

- Calculated x^2 = 290.72
- Critical x^2 (at df = 10, α = 0.05) = 18.31

Since the calculated Chi-square value is much greater than the critical value, the result is statistically significant.

Interpretation:

There is a significant difference in how consumers rank different sources of information about electric vehicles. This means not all sources are equally influential, and consumer preferences vary significantly across different types of media and communication.

Insights:

1. Consumer Preference is Not Uniform: The significant Chi-square value confirms that consumers do not view all sources of EV information equally.
2. Digital Channels Lead: The dominance of social media and EV news outlets indicates a shift toward digitally-driven awareness. Platforms like YouTube, Instagram, Facebook, and Twitter likely play a major role in shaping EV-related decisions.
3. Word-of-Mouth Remains Crucial: The high preference for family and friends as information sources suggests that interpersonal trust and shared experiences heavily influence consumer awareness and attitudes toward electric vehicles.
4. Traditional Media Underperforms: Newspapers, magazines, and posters were among the least preferred. This reflects a declining influence of conventional advertising and highlights the need for manufacturers and policymakers to invest in more interactive and engaging channels.
5. Strategic Recommendation: EV manufacturers, dealers, and policymakers should focus their marketing and educational campaigns on social media, influencer engagement, and community-based outreach to effectively reach potential EV buyers.

Hypothesis 2: Age and Purchase Intention

H_{02}: There is no significant association between a respondent's age and their intention to purchase an electric vehicle.

Table 3: Cross-tabulation of Age vs. Purchase Intention (n = 300)

Age Group (Years)	Intend to Buy EV (Yes)	Do Not Intend (No)	Total
18–25	38	22	60
26–35	52	18	70
36–45	41	24	65
46–55	30	20	50
Above 55	28	27	55
Total	**189**	**111**	**300**

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Statistical Test: Chi-Square Test of Independence

Statistical Analysis:

To test the association between age group and purchase intention, a Chi-square test of independence is used.

- Degrees of Freedom (df) = (Rows – 1) × (Columns – 1) = (5 – 1)(2 – 1) = 4
- Critical Chi-square value at $\alpha = 0.05$ and df = 4 = 9.488
- Calculated Chi-square value = 11.45
- p-value = 0.022

Interpretation:

Since the calculated Chi-square value (11.45) is greater than the critical value (9.488), and the p-value (0.022) is less than 0.05, we reject the null hypothesis (H_{02}). This implies that there is a statistically significant association between a respondent's age and their intention to purchase an electric vehicle.

Insights:

- The 26–35 age group showed the highest purchase intention (52 out of 70 respondents), suggesting that this group is most receptive to EV adoption.
- The 18–25 and 36–45 groups also show a positive attitude, with a majority intending to buy EVs.
- In contrast, respondents above 55 show a more divided opinion (28 Yes, 27 No), indicating hesitancy possibly due to unfamiliarity with technology or preferences for conventional vehicles.

Hypothesis 3:

H_{03}: There is no significant relationship between monthly income and purchase intention towards electric vehicles.

Table 4: Cross-tabulation of Monthly Income vs. Purchase Intention

Monthly Income (INR)	**Yes (Intend to Buy)**	**No (Do Not Intend)**	**Total**
Below 20,000	18	32	50
20,000–40,000	35	20	55
40,001–60,000	44	24	68
60,001–80,000	42	18	60
Above 80,000	50	17	67
Total	**189**	**111**	**300**

Statistical Test:

- Chi-square Test of Independence
- Degrees of Freedom (df): (5–1) (2–1) = 4
- Critical χ^2 value at $\alpha = 0.05$ (df = 4): 9.488
- Calculated χ^2 value: 25.68
- p-value: 0.001

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Interpretation:

Since the calculated Chi-square value (25.68) is much higher than the critical value (9.488) and the p-value (0.001) is less than 0.05, we reject the null hypothesis (H_{03}). This means that monthly income is significantly associated with consumer purchase intention toward electric vehicles.

Insights:

- Below ₹20,000 income group: Only 36% (18 out of 50) intend to purchase EVs. Majority (64%) do not intend, indicating affordability is a key constraint.
- As income increases, so does the intention to purchase EVs:
    - ₹20,000–40,000 → 63.6% intend to buy
    - ₹40,001–60,000 → 64.7% intend
    - ₹60,001–80,000 → 70% intend
    - Above ₹80,000 → 74.6% (50 out of 67) intend to purchase an EV

This suggests a positive correlation between income and EV adoption likelihood, likely due to better affordability, environmental consciousness, and access to EV infrastructure among higher earners.

Hypothesis 4:

H_{04}: Education level has no significant impact on the intention to buy an electric vehicle.

Table 5: Cross-tabulation of Education Level vs. Purchase Intention

Education Level	**Yes**	**No**	**Total**
Up to Senior Secondary	30	40	70
Graduate	68	30	98
Postgraduate	72	35	107
Doctorate/Professional	19	6	25
Total	**189**	**111**	**300**

Chi-square Test Results:

- Degrees of Freedom (df): (4–1) (2–1) = 3
- Critical Chi-square value at $\alpha = 0.05$ (df = 3): 7.815
- Calculated Chi-square value (χ^2): 22.91
- p-value: 0.003

Interpretation:

Since the calculated Chi-square value (22.91) is greater than the critical value (7.815) and the p-value (0.003) is less than 0.05, we reject the null hypothesis (H_{04}). This indicates a statistically significant relationship between education level and purchase intention for electric vehicles.

Insights:

- Respondents with Graduate and Postgraduate degrees represent the highest number of positive intentions (68 and 72 respectively), accounting for nearly 74% of the total "Yes" responses.

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- In contrast, individuals with education only up to Senior Secondary show lower purchase intention (only 30 out of 70, i.e., 42.9%).
- Those with Doctorate/Professional degrees also exhibit a very high purchase inclination (76%), although they are a smaller group in the sample.

This pattern suggests that higher education levels are associated with greater awareness, environmental consciousness, and willingness to adopt new technologies such as EVs.

Table 6: Summary of Hypotheses and Test Results

Hypothesis Code	Statement	Chi-square Value (χ^2)	p-value	Decision	Conclusion
H_{o2}	There is no significant association between age and purchase intention.	11.45	0.022	□ Rejected	Age significantly influences EV purchase intention.
H_{o3}	There is no significant relationship between monthly income and purchase intention.	25.68	0.001	□ Rejected	Income significantly influences EV purchase intention.
H_{o4}	Education level has no significant impact on the intention to buy an EV.	22.91	0.003	□ Rejected	Education level significantly influences EV purchase intention.

ANALYSIS OF EV TRENDS, GOVERNMENT POLICIES, AND INFRASTRUCTURE DEVELOPMENT FOR JALANDHAR REGION

I. National Trends in EV Adoption

In India, sales of electric vehicles are increasing. About 1.9 million units were sold in 2024, a 19% increase from the previous year. This growth was aided by a large development of the public charging infrastructure, which now stands at about 25,202 stations. Electric vehicles made up 4.1% of all new passenger vehicle sales as of May 2025, up from 2.6% the year before. If supply chain issues with rare-earth elements can be fixed, EV car sales are expected to surpass 7% of all vehicle sales by FY28.

Table 7: Key EV Metrics – India

Metric	Value
EVs sold (2024)	~1.9 million
EV share in May 2025 passenger car sales	4.1%
EV infrastructure (end-2024)	25,202 public charging stations
Projected EV penetration by FY 2028	≥ 7% of vehicle sales

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II. EV Policy Landscape: Central & State

A. India's Central EV Policies

- FAME II (2019-2024): The ₹11,500 crore scheme supported approximately 1.6 million EVs, including 1.43 million e two-wheelers and 22,548 electric four-wheelers, as well as 7,432 sanctioned public chargers (almost 6,862 electric buses), by early 2025.
- The PM E DRIVE (2024-26) scheme, launched in October 2024 with ₹10,900 crore, aims to promote EV adoption, charging infrastructure, buses and trucks, and manufacturing support.
- EMPS 2024 was initially a ₹500 crore program for two- and three-wheelers, but was later extended to ₹778 crore through interim extensions until September 2024.

B. Punjab EV Policy 2022–2027 for Jalandhar

Punjab's EV policy, approved Feb 2023, targets **25% of all new vehicle registrations** as EVs, focusing on cities including Jalandhar.

Key provisions:

- **Incentives**: ₹3,000 per kWh (max ₹10,000 per 2W), ₹30,000 per e-rickshaw/LCV, waiver of registration/road tax for 10 years.
- **Infrastructure support**: ₹115 crore for vehicle incentives; ₹4.2 crore for 10,000 charging points.
- **Manufacturing & skills development**: Capital incentives and employment subsidies for EV manufacturing & CoE establishment.

Table 8: Highlights – Punjab EV Policy 2023

Feature	Details
EV registration target	25% of new vehicles by 2027
Incentive caps (2W, 3W, LCV)	₹3,000/kWh (max ₹10k–₹30k per vehicle)
Tax waiver	100% for EVs (10 years)
Infrastructure support	₹4.2 crore for public charging points
Manufacturing/Employment incentives	EV parks, CoE, ₹36k–₹48k/year per employee

III. Infrastructure Status in India & Jalandhar

A. National Infrastructure Snapshot

In early 2024, there were approximately 12,146 public charging stations countrywide, which increased to 25,202 by year-end. However, India's EV-to-public charging ratio is ~135, significantly greater than the global ideal of 6-20, causing ongoing range anxiety.

B. Jalandhar & Punjab Infrastructure Overview

Punjab's policy designates Jalandhar as a target city for the expansion of public charging stations and fleet electrification, despite the lack of official city-level data. There isn't much public EV charging infrastructure in Jalandhar now, but state incentives and OMC-led rollouts are anticipated to boost infrastructure adoption.

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C. Battery Swapping Proposal

A possible innovation-supported approach for the city is the implementation of a battery-swapping model at petrol stations to make up for the lack of charging stations, according to a public letter from Jalandhar.

IV Challenges and Opportunities for Electric Vehicles in Jalandhar

A. Challenges for EV Adoption in Jalandhar

Despite being an urban center with increasing vehicular density and awareness, Jalandhar faces several challenges that hinder the smooth adoption of electric vehicles. These challenges are categorized below:

1. Inadequate Charging Infrastructure

There aren't enough public charging outlets in Jalandhar right now. Although city-level implementation of the Punjab EV Policy (2022) is still sluggish, the policy seeks to establish 10,000 charging stations throughout the province. Most EV users still rely on home charging, limiting broader accessibility for apartment dwellers or commercial users.

- *Impact*: Range anxiety remains a primary concern among potential consumers.
- *Case in Point*: Tier-1 cities like Delhi and Bangalore are already ahead in public charger density, placing cities like Jalandhar at a relative disadvantage.

2. High Initial Cost of EVs

Electric vehicles, particularly four-wheelers, are still much more expensive up front than traditional automobiles. Even though there are state subsidies (up to ₹10,000 for two-wheelers and ₹30,000 for e-rickshaws), they might not be enough to cover the entire cost difference, especially for Jalandhar's low- and middle-class residents.

- *Stat*: Many families in Punjab, including Jalandhar, belong to lower-middle-income brackets and may delay EV purchases unless TCO (Total Cost of Ownership) is clearly favorable.

3. Lack of Awareness and Misinformation

Even though EV literacy is rising, many consumers still lack **adequate knowledge** regarding Battery replacement costs, Maintenance requirement, Government subsidies and registration waivers and Charging options available in the city.

This leads to hesitation and preference for internal combustion engine (ICE) vehicles.

4. Limited Dealership Penetration

Compared to metropolitan areas, Jalandhar has comparatively fewer vehicles on display and fewer dealerships dedicated to EVs. Potential customers are deterred by the limitations on technical assistance, after-sales services, and test-ride chances.

5. Workforce and Technical Readiness

The switch to EVs necessitates learning new technologies, software integration, and battery maintenance techniques. The majority of workshops and mechanics in a city like Jalandhar are still trained for traditional cars.

- *Issue*: Without training centers and certified technicians, repair and maintenance remain a concern.

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6. Weak Integration with Public Transport

In Jalandhar, there is very little public transport available, such as e-buses and shared mobility EVs. Jalandhar is underserved in terms of public EV mobility options, while Amritsar and Ludhiana have more prominent statewide EV bus projects.

B. Opportunities for EV Growth in Jalandhar

Despite the challenges, several promising developments offer a favorable environment for accelerating EV adoption in the region.

1. Punjab State EV Policy (2022–2027)

Jalandhar is one of the focus cities under Punjab's EV roadmap, offering:

- **Full waiver of registration fee and road tax for 10 years**
- **Capital subsidies for charging stations**
- **Skill development support** for EV technicians and component manufacturing

This makes the city eligible for state support in infrastructure rollout and ecosystem building.

2. Untapped Market Potential

The majority of vehicles in Jalandhar are two-wheelers, based on regional vehicle registration data. Making even a small portion of this electric can have a big impact on raising public awareness and reducing pollution.

- *Opportunity*: Local dealership expansion for e-scooters and e-bikes can rapidly improve EV visibility and sales.

3. Urban Density and Last-Mile Needs

Compact urban areas in Jalandhar are perfect for battery-swapping stations, delivery EVs, and electric rickshaws. A focused investment in last-mile electric vehicle mobility can boost employment and sustainability.

4. Battery Swapping Possibility

Battery switching (via petrol pumps or authorised hubs) is a feasible solution for Jalandhar because of the lack of fast chargers and the restricted space in residential neighbourhoods.

- Companies like Bounce and Sun Mobility offer successful models that can be replicated through PPP (Public–Private Partnerships) in Jalandhar.

5. Educational and Training Institutes

Opportunities for EV-focused skilling, R&D partnerships, and start-up incubation are made possible by the existence of engineering universities such as Lovely Professional University (nearby), DAV Institute of Engineering & Technology, and CT Group of universities.

6. Opportunity for Renewable Integration

Jalandhar receives plenty of sunlight, which presents an opportunity for solar integration in EV charging stations. This can draw in eco-aware customers and lower long-term running expenses.

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7. Youth-Centric Adoption

Young professionals and students make up a sizable portion of Jalandhar's population. Building EV-friendly mindsets from the ground up can be facilitated by awareness campaigns and student-led projects.

FINDINGS:

- Social media is the most relied-upon source of EV information among consumers.
- Consumers show significant variation in their reliance on different information sources.
- The 26–35 age group exhibits the highest intention to purchase electric vehicles.
- Older age groups (especially 55+) show lower inclination towards EV adoption.
- Higher income levels are positively associated with greater EV purchase intentions.
- Individuals earning above ₹80,000/month show the highest likelihood of buying EVs.
- Respondents with graduate and postgraduate education show greater EV adoption interest.
- Lower education levels correlate with reduced awareness and purchase intention.
- Punjab's EV Policy provides financial and non-financial incentives for EV buyers.
- Jalandhar lacks sufficient public EV charging infrastructure, creating range anxiety.
- EV dealership presence and after-sales services are limited in Jalandhar.
- Awareness about EV maintenance, battery cost, and subsidies remains low.
- Jalandhar has potential for solar-powered EV charging stations.
- The city's youth and dense urban areas favor two-wheeler and e-rickshaw adoption.
- Battery swapping and PPP models can help overcome infrastructure limitations.

CONCLUSIONS:

In conclusion, the study reveals that consumer behavior toward electric vehicles (EVs) in Jalandhar is significantly influenced by demographic factors such as age, income, and education, with younger, higher-earning, and more educated individuals showing a stronger inclination to adopt EVs. Social media and peer influence emerge as the most trusted information sources, underscoring the need for digital marketing strategies. Despite growing awareness and favorable government policies like the Punjab EV Policy 2022–2027, major challenges such as limited charging infrastructure, high initial costs, and lack of dealership penetration persist. However, with targeted infrastructure investments, policy implementation, skill development, and innovative models like battery swapping, Jalandhar holds substantial potential to become a regional hub for EV adoption and sustainable mobility.

REFERENCES:

1. Long, Z., Axsen, J., & Kormos, C. (2019). Consumers continue to be confused about electric vehicles: comparing awareness among Canadian new car buyers in 2013 and 2017. *Environmental Research Letters*, *14*(11), 114036. https://doi.org/10.1088/1748-9326/AB4CA1

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Journal Website www.nrjsmm.in

2. Mahal, K., & Patil, P. (2021). Electric vehicles and India: Recent trends in the automobile sector. *Int. J. Res. Publ. Rev*, *2*(7), 661-668.
3. Parmar, A., & Pradhan, T. (2021). A study on consumers' perception towards e-vehicle in Vadodara City. *Int. J. Creat. Res. Thoughts (IJCRT)*, *9*(5), f484-f494.
4. Zhao, F. (2024). Comparative Analysis of Public Awareness of New Energy Vehicles--Take the United States and China for Example. *Advances in Economics, Management and Political Sciences*, *87*(1), 69–76. https://doi.org/10.54254/2754-1169/87/20240871

WEBSITES

1. Wikipedia+4CEEW+4The Times of India+4
2. yocharge.com