



Factors Affecting Electric Vehicles Purchase Decisions of Customers: Literature Review

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Abstract:

Electric vehicles (EVs) offer a promising path towards sustainable transportation, addressing climate change and air pollution concerns, and are gaining popularity globally. India's Electric Vehicle (EV) sector is experiencing rapid growth, fuelled by government incentives, rising environmental concerns, and technological advancements. With initiatives like the Faster Adoption and Manufacturing of Hybrid and Electric Vehicles (FAME) scheme, India aims to significantly increase EV adoption, revolutionizing its transportation landscape towards sustainability and innovation.

In 2023, the global electric vehicle market was valued at US\$ 255.54 billion. It is forecasted to reach approximately US\$ 2,108.80 billion by 2033, growing at a significant CAGR of 23.42% from 2024 to 2033. According to Fortune Business Insights, the Indian EV market is forecasted to expand from US\$ 3.21 billion in 2022 to US\$ 113.99 billion by 2029, with a 66.52% CAGR. The Indian EV battery market is projected to surge from US\$ 16.77 billion in 2023 to a remarkable US\$ 27.70 billion by 2028. Maharashtra targets 10% share of EVs in all new vehicle registrations by Dec 2025. Karnataka has set a goal to electrify 100% of three and four-wheeler cargo vehicles by December 2030. On a state-wide level, Goa leads the country in EV penetration, with 14.20% of all new vehicles sold this year being electric, followed by Tripura and Chandigarh. Delhi also stands out with a 10.72% penetration.

In this research paper, researcher has referred 95 national and international research papers and then twenty-three (23) articles processed for literature review. Such processed literature review is presented in the form of research paper write-up.

Key Words: Electric Vehicles, Factors affecting Electric Vehicles, Literature Review.

(Source: <https://www.ibef.org/industry/electric-vehicle>)

Introduction:

Electric vehicles (EVs) offer a promising path towards sustainable transportation, addressing climate change and air pollution concerns, and are gaining popularity globally. India's Electric Vehicle (EV) sector is experiencing rapid growth, fuelled by government incentives, rising environmental concerns, and technological advancements. With initiatives like the Faster Adoption and Manufacturing of Hybrid and Electric Vehicles (FAME) scheme, India aims to significantly increase EV adoption, revolutionizing its

transportation landscape towards sustainability and innovation.

Objectives of Study:

1. Searching relevant literature
2. Identify relevant literature.
3. Review identified literature.
4. Organise, record information as literature Review.

Research Methodology:

Researcher has used secondary data sources for collection of literature. Major source was Google scholar and ninety-five (95) articles were screened by using text

mining technique confined to the word 'electric vehicles' and 'factors affecting EVs' were selected for developing relevant database & process further for literature review drawing conclusion. In this paper twenty-three (23) articles are used for research paper write-up.

Literature Review:

Sahilkumar Mahera and et.al (April 2024) (Mehera, 2024) article titled as, **“Consumer Perception Towards Electric Two-Wheeler in Vadodara City”**, found that majority of the samples were aware of EVs and getting to know about it through social media websites and advertisements also affects them positively. The environment friendly benefit associated with EVs attract people towards EVs but still driving range anxiety and maintenance are the concerns for the users. The concluding strata of the paper says that, Government, Manufacturers and marketers should focus on concerns of EVs like charging range anxiety, Maintenance and Purchase Cost so as to witness growth of EV market. (2024)

Dr. Ashutosh Zunjur and et.al., (April'2024) (Zunjur,2024) a research paper titled, **“Identifying the most valued attribute of EV car in India through conjoint analysis”** research findings show that, charging time and range of the car per full charging is the most valued attribute of EV car in India. Kilometer range, Price of the car, charging stations (infrastructure facility), are considered to be limiting attributes to the consumers. (2024)

Namrata Agrawal and et.al., (March 2024) (Agarwal, 2024) a research paper titled, **“Issues & Challenges in adoption of Electric Vehicles in India: An Empirical study using Data Analytics”** research paper findings state that, India needs optimal charging infrastructure strategies. Battery recycling and reuse should be taken into account. Assessment of economic and environmental benefits to be initiated. EVs

needs to couple with Solar, renewable, wind generation, sources of energies and synergies needs to be created. Continuous efforts need to be undertaken for market awareness and EVs adoption in India. (2024) **Nataraj Balasubramanian and et.al.,** (February'2024) (Balasubramanian,2024) a research paper titled, **“Sustainable transportation in developing countries: uncovering factors influencing electric vehicle purchase intention in India”** research paper finding states that, the government subsidies act as an inducement and are helping to purchase EVs but are not uniform across all states of India so a location specific study needs to be done. The data is collected through social media tweets so has its own limitations hence further study needs to be done. Preference of EVs vary according to product categories so specific studies need to be done further for analyzing factors. Studying consumer behavior is vital for automakers and policymakers to promote EVs in India as sustainable future. (2024).

Lalit N. Patil and et.al., (November'2023) (Patil, 2023) a research paper titled, **“Investigation on different parameters associated with purchase of electric vehicle in India”** findings are environment concern has great influence on the purchase decision of customers. EV driving experience, ease of use, perceived advantages, have positive influence on purchase of EVs. (2024)

Furqan A. Bhat and et.al., (September'2023) (Bhat,2023) a research paper titled, **“Who will buy electric vehicles? Segmenting the young Indian buyers using cluster analysis”** findings revealed that ten latent variable impact the adoption of EVs out of which eight variables are used for segmentation viz. social image, social influence, anxiety (or perceived risks), perceived environmental benefits, performance expectancy, effort expectancy, facilitating conditions, and attitude, and the

other two latent factors viz. environmental enthusiasm and technological enthusiasm are studied to see what kind of perception of Individual will buy EV positive, Neutral (slightly positive) or negative perception. Positive perception people will tend to buy EV in near future as per conclusion.

Chayasmitha Deka and et.al., (July 2023) (Deka, 2023) a research paper titled, **“Can gain motivation induce Indians to adopt electric vehicles? Application of an extended theory of Planned Behavior to map EV adoption intention”** findings state that, subjective norms followed by perceived behavioral control emerge as the significant and direct intention formation. Cost, herd behavior, and personal norms alone do not influence intention formation. (2023)

Weishang Guo and et.al., (May'2023) (Guo,2023) a research article titled, **“Heterogeneous Factors Influencing Electric Vehicle Acceptance: Application of Structural Equation Modeling”** findings state that, there is a disparity found between urban and peri-urban individuals about willingness and acceptance of EVs. The research concluded with policy decision as concluding remarks. (2023)

Udit Chawla and et.al., (April 2023) (Chawla 2023) research article titled, **“Factors Influencing Customer Preference and Adoption of Electric Vehicles in India: A Journey towards More Sustainable Transportation”** findings state that, Charging Time (CT), Innovation (IN), Perceived Quality (PQ), Perceived Affordability (PA), Awareness (AW), and Comfort (CM) and its influences adoption of EVs. Consumer loyalty, power efficiency, charging system, and consumer acceptance have a moderate effect on satisfaction. (2023)

Saumya Diwan and et.al., (March 2023) (Diwan 2023) a research paper titled, **“Analyzing the factors influencing the Electric Vehicle Selection using Fuzzy AHP and TOPSIS-SAW-COPRAS-**

ELECTRE Framework” findings state that, purchase price, full charge time are most important factors for purchasing decisions followed by Quick Charge Time, Range, Ground Clearance, and Acceleration. (2023)

Dr. Laxmikant B. Deshmukh and et.al., (March'2023) (Deshmukh'2023) a research paper titled, **“An Analysis of Buying Decision for Electric Two Wheelers -A Study of Vidarbha Region”** findings state that, environmental concern, perceived economic benefit, charging infrastructure, and social influence significantly impact consumers attitudes towards electric two-wheelers. Perceived economic benefits is the main factor to purchase Electric two-wheeler. Women are more inclined to purchase EVs then Men, as found in studies. (2023)

H. Nurgul Durmus Senyapar and et.al., (February'2023) ((Senyapar,2023) a research paper titled **“Analysis of Consumer Behavior towards Electric Vehicles: Intentions, Concerns and Policies”** findings state that, adoption of EVs can be possible, to increase the level of adoption of environmentally friendly electric vehicles by using marketing communication tools. Expanding the market by eliminating technological, economic, etc. Concerns considering current findings will be an important step for a sustainable future. (2023)

Gulnaz Ivanova and et.al., (February'2023) (Ivanova,2023) a research paper titled, **“Antecedents of Electric Vehicle Purchase Intention from the Consumer's Perspective: A Systematic Literature Review”** the paper concludes that, the analysis of the articles in the sample verified an increasing trend in the academic literature on the topic, especially in the last five years. The diverse geography of the studies conducted is an interesting sign of global interest in the subject. There was a strong predominance of quantitative

methodology, which was conducted through a questionnaire survey. The researchers adopted different theoretical perspectives; however, the theory of planned behavior is a dominant theory in the studies conducted. Understanding consumer behavior towards EV purchase remains a challenging and complex issue with a strong need for further research. (2023)

Nitin Upadhyay and et.al., (January 2023) (Upadhyay, 2023) research paper titled, **“Examining Indian consumer pro-environment purchase intention of electric vehicles: Perspective of stimulus-organism-response”** the results of the study shows that pro-environment responsibility significantly impacts pro-environment attitude and pro-environment value and has a direct impact on the purchase intention of EVs. This research can be done in different countries and different cultures. (2023)

Kathrin Monika Buhmann and et.al., (December 2022) (Buhmann 2022) transportation research paper titled, **“Consumers’ preferences for electric vehicles: The role of status and reputation”** the findings of the research are: women are more environmentally concerned than men. Higher the education, higher the likelihood of preferring EVs. People residing in urban areas prefer EVs. The high purchase price is the most hesitant factor in EVs and even subsidies are not able to suffice it. Travel range, quality of batteries are concerns to the consumers during long range travels. (2022)

Mr. S. Chandra Sekhar and et.al., (October 2022) (Sekhar 2022) research paper titled, **“Factors Influencing Customers’ Buying Behavior: A Study of Electric Vehicles with reference to Tirupati City”**, the research paper has identified that there are following factors making EVs popular: a) fewer mechanical parts making EVs less maintaining and servicing cost vehicle, b)

electricity is cheaper than fuel, c) incredibly fast with less noise, d) running cost is less compared to ICE vehicles. The research results show that, needs, less expensive, Government incentives, global warming and easy maintenance, operating cost, driving range, charging duration, vehicle performance and brand diversity are majorly influenced the purchase decision of E-vehicles are the factors which have influenced the buyer’s decision of different e-vehicles buying decisions. It further states that, income, age & E-vehicle potential benefits are having strong influence on the preference of EV. Women prefer EVs over men. Consumers have concerns for charging stations. The research paper concludes with commenting need for carrying out further research on electric vehicles technologies and need for development of charging stations. (2022)

Dr. Deepika Pandita and et.al., (August’2022) (Pandita,2022) a research paper titled, **“ a conceptual model for understanding the barriers to the adoption of electric vehicles in India”** the findings state that, psychological barriers are affecting adoption of EVs. Following five factors noise, resistance to change, lack of fun, lack of awareness, and fear of explosion and together these form a psychological barrier to EV adoption and EV manufacturers and marketers need to deal with positively for its adoption. (2022)

Davender Duggal and et.al (August’ 2022) (Duggal’2022) a research paper titled, **“Critical analysis of market penetration strategies for EVs in India”** the findings of the study states that, EVs is a cost delicate market. EVs are by & large appropriate for Indian driving circumstances. The paper concludes with that considering the historical implementation of development and government policies, Indians buy concern, new technology and reaction to the economy, Growth in internal combustion engine technology is automatic and still in

demand for geared vehicles will increase in the future. EVs and PHEVs have a bright future in India, but Growth is limited and limits are determined by policy and awareness Creation. The road to sustainable transportation will be slowed down Lack of EPT (electronic precision technology) manufacturers, clear guidelines, and Implementation. (2022)

Ishika Ranjan and et.al., (June'2022) (Ranjan,2022) a research paper titled, **“A study on Consumer Buying Behaviour towards Electric Vehicle”** The study concludes that, Majority of the ones who are inclined towards buying an electric vehicle and wanting to shift to EVs. The ones who are likely to buy an EV are also interested in buying if the company offers an exchange value on their owned vehicle to buy an electronic vehicle. They also believe that the cost to charge an electric vehicle is much less than the fuel costs for a petrol or diesel vehicle. But also feel charging an EV is hectic. The major reason behind the slow growth of the EV industry in India is the lack of infrastructure and lack of charging pumps which is why a majority of consumers are against EV purchases. Also, there lack of awareness among consumers towards EVs. Better infrastructure, awareness campaigns, promotional activities of electric vehicles will surely help this industry penetrate the Indian automobile market. (2022)

Silvana Secinaro and et.al., (June'2022) (Secinaro,2022) a research paper titled **“Electric vehicles' consumer behaviours: Mapping the field and providing a research agenda”**. The research reveals the primary co-citation network between international journals and authors, a map of the leading research centres on the topic, and the dimensions covered by scholars. Additionally, the analysis extends the theory of planned behaviour, offering a valuable consumer identikit for practitioners. Based on the results, the study provides multiple

research questions helpful to feed the academic debate. (2022)

Sofana Reka S and et.al., (May 2022) (Reka, 2022) a research review titled, **“Analysis of Electric Vehicles with an Economic Perspective for the Future Electric Market”** From the research, it is observed that, driving range, charging infrastructure, battery capacity and cost, battery aging and performance, and drive performance are the parameters that affects EVs overall performance. The findings of the socioeconomic impact on EV market are on large scale and vary from EV model to model, maximum drive range (293 kms), city driving conditions, travel distance, charging stations and time to charge. It further states that, through grid system, energy flow and the reduction in the cost consumption is possible. The research concludes as, EVs has impact on environment. EVs has maintenance cost advantage over ICE. Smart grids connected to charging stations are presenting flexibility to the EV users and cost effective. (2022)

Chetan Gajananrao Upadhye and et.al., (April'2022) (Upadhye,2022) a research paper titled, **“Problem and Prospects of Electric Vehicle in Indian Market”**, the study area was limited to Maharashtra. The research paper concluded with a very positive remark on EVs, it says that, EV is the future of market and market will see transition in near future.

Dr. Prakash Rajaram Chavan (April' 2022) (Chavan,2022) a research paper titled, **“To Study the Peoples' Perspective on Future of Global E-vehicle Industry”**, it is found from the study that, people are considering EVs are future of EV market. The research paper concluding remarks states that further research should be carried out on satisfaction level of EVs. (2022)

Conclusion:

From the above research paper articles, it is concluded that, people are

considering electric vehicles as a viable Eco-friendly option. Electric vehicle is the future of market and market will see transition in near future. EVs has positive impact on environment. EVs has maintenance cost advantage over ICE. The cost to charge an electric vehicle is much less than the fuel costs for a petrol or diesel vehicles. The socioeconomic impact on EV market are on large scale and vary from EV model to model, maximum drive range, city driving conditions, travel distance, charging stations and time to charge. Charging an EV is hectic. driving range, charging infrastructure, battery capacity and cost, battery aging and performance, and drive performance are the parameters that affects EVs overall performance. Psychological barriers like noise, resistance to change, lack of fun, lack of awareness, and fear of explosion are affecting adoption of EVs. Factors such as needs, less expensive, Government incentives, global warming and

easy maintenance, operating cost, driving range, charging duration, vehicle performance and brand diversity are majorly influences the purchase decision of E-vehicles. Women are more environmentally concerned than men. Higher the education, higher the likelihood of preferring EVs. People residing in urban areas prefer EVs. The high purchase price is the most hesitant factor in EVs, subsidies are not able to suffice it. Travel range, quality of batteries are concerns to the consumers during long range travels. Factors like purchase price, full charge time are most important factors for purchasing decisions followed by Quick Charge Time, Range, Ground Clearance, and Acceleration. Therefore, EVs are going to be norm of being responsible citizen as its eco-friendly.

Note: References are not given as review included here states from where it is taken.