



# “A COMPREHENSIVE PROJECT ON STUDY ON THE MOST APPEALING ELECTRIC CAR SEGMENT TO INDIAN CONSUMER”

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## **ABSTRACT:**

India has been acknowledged as one of the most important regions in the global automotive industry. Several companies are establishing manufacturing facilities in India aggressively. EVs account for only about 4.7% of total automobile sales in 2022, but the Indian government has ambitious targets for increasing EV adoption over the next decade, with a focus on increasing purchases of four-wheel vehicles.

The sales of electric vehicle increase 328.53% in the year 2022 compare to 2021 and which makes us curious about sales of electric vehicle that which segment of electric vehicle is appealing to the Indian market with special reference with dimension of electric car. For the development of deeper understanding for particular market we collected 159 samples to get clear picture.

**KEYWORDS:** Electric Car, Electric vehicle, Segments, Dimensions

## **INTRODUCTION**

There are many opportunities for businesses operating in this industry as the Indian electric vehicle market is expanding quickly. As fuel prices continue to rise, electric vehicles are growing in popularity. This is especially true in India, where the adoption of renewable energy in the transportation sector will be aided by the new electricity

demand that electric mobility will generate.

Let's take a broader look at India's auto industry before examining the state of the EV segment. The \$222 billion Indian auto industry is currently ranked fifth globally, but policymakers anticipate it to advance and take third place by the end of the decade. The nation is also the second-largest manufacturer of buses in the world and the world's largest producer of two- and three-wheelers. These figures offer the Indian market the chance to significantly lower emissions by greening its mobility.

India's electric vehicle (EV) market is expanding as a result of a number of important factors, such as government support, growing environmental consciousness, and technological advancements. The Indian government has taken action to encourage the use of EVs by providing tax breaks and consumer subsidies as well as funding the construction of charging infrastructure. EVs are gaining popularity as a more sustainable and environmentally friendly option as people become more aware of the negative effects that conventional fossil fuel-powered vehicles have on the environment. The appeal of EVs has been further increased by improvements in battery technology and the availability of convenient charging options. In the upcoming years, it is anticipated that India's EV market will continue to grow thanks to continued investment from both the public and private sectors.

### Drivers & Restraints

- Government E-Mobility Initiatives are Growing, Driving Up Product Demand
- Electric vehicle battery costs are steadily declining, which will fuel market expansion.
- Passenger vehicles' comfort and driving range make the segment the market leader.
- The region's increasing demand for electric micromobility is driving the market's expansion.
- A brief halt in production hinders market expansion
- Four-Vehicle Segment is Driven by Increasing Demand in the Automotive Industry Sector
- Demand for Clean Emissions Will Increase, Favoring Market Growth

### Competitive Environment

Major companies, like TATA Motors, are making significant investments in R&D initiatives and technological fields to build strong footholds in the electric vehicle market. The company also manufactures cars, trucks, buses, utility vehicles, and defence vehicles. Additionally, it produces axles and transmissions for commercial vehicles as well as engines for industrial and marine applications. The company's two EV models, the Tigor and Nexon, sold 694,159 units of EVs in India.

## LITERATURE REVIEW

### RESEARCH GATE

In the present scenario, air pollution has become a serious concern for India. According to a recent global report, many cities in India are the most polluted cities. The major sectors contributing to air pollution are the industrial sector and the transport sector. Of this, 51% of air pollution is caused by the industrial sector and 27% by the transport sector. Air pollution contributes to the premature deaths of 2 million Indians every year. In order to minimise air pollution, electric vehicles (EVs) can act as a blessing in lowering GHG emissions. Electric vehicles offer numerous advantages, such as decreasing pollution levels, reducing oil import bills, etc. This paper provides

a brief literature review on electric vehicles (EVs) and compiles the advantages and threats of promoting EVs in India.

### **ICCT (The international council on clean transportation)**

Governments around the world are implementing policies to promote electric vehicles to reduce dependence on oil, decrease greenhouse gas emissions, and improve air quality. Annual global electric vehicle sales have been steadily on the upswing, from just a few hundred in 2010 to over 500,000 in 2015 and over 750,000 in 2016. The cumulative global market reached the milestone of 1 million electric vehicles in September 2015, and from there quickly grew to 2 million in January 2017. The early market growth for electric vehicles continues, but a number of barriers prevent their more widespread uptake. These barriers include the additional cost of the new technology, the relative convenience of the technology considering range and charge times, and consumer understanding about the availability and viability of the technology. This last point, typically referred to as "consumer awareness," is crucial. The development of electric vehicle markets is fundamentally tied to prospective consumers' general awareness and understanding of the potential benefits of electric vehicles.

Automobile manufacturers and dealers, electric utilities, and other groups are engaged in many activities to help overcome barriers to consumer awareness about electric vehicles. create print and online information and tools, organise events and workshops, increase exposure to electric vehicles through fleet and car sharing services, create action plans for electric vehicle readiness, carry out highly visible technology demonstration projects, conduct social media marketing campaigns, and more These actions are essential because many prospective consumers generally lack an understanding of what electric vehicles are, what benefits they offer, the models that are available, and the associated incentives.

### **IEEE XPLOR**

Electric vehicles are becoming the order of the day due to their various advantages over normally used IC-engined vehicles. The bloom of this particular field is making the environment greener and causing less pollution. The main part of an EV that makes it function more competitively is the motor propulsion. The design and drive system for such a machine is an area that needs more concentration in order to make the EV system an effective one. An EV is one that is propelled by electric motors and uses energy stored in batteries. Unlike IC-engine vehicles, EVs do not produce exhaust gases during their operation, which makes this system more environmentally friendly. The sources of conventional vehicles like fossil fuel will soon be depleted and there will be a situation where consumers are expected to look for any other alternative. So it is better to work in a focused manner and switch over to the alternative choice, which is an electric vehicle. There are numerous sources for making EVs possible,

and they will never run out. The proposed work is to carry out a literature survey on the design of electrical machines and their drive systems used for EV-based applications.

### **TYLOR & FRANCIS ONLINE**

Widespread adoption of electric vehicles (EVs) may contribute to the alleviation of problems such as environmental pollution, global warming and oil dependency. However, the current market penetration of EVs is relatively low in spite of many governments implementing strong promotion policies. This paper presents a comprehensive review of studies on consumer preferences for EVs, aiming to better inform policy-makers and give direction to further research. First, we compare the economic and psychological approaches towards this topic, followed by a conceptual framework of EV preferences, which is then implemented to organise our review. We also briefly review the modelling techniques applied in the selected studies. Estimates of consumer preferences for financial, technical, infrastructure, and policy attributes are then reviewed. A categorisation of influential factors for consumer preferences into groups such as socio-economic variables, psychological factors, mobility conditions, social influence, etc. is then made and their effects are elaborated. Finally, we discuss a research agenda to improve EV consumer preference studies and give recommendations for further research.

### **SCIENCE DIRECT**

The widespread use of electric vehicles (EVs) may help to alleviate issues such as pollution, global warming, and oil reliance. EV market penetration is currently low, despite several governments undertaking aggressive promotion measures. This study provides a thorough assessment of studies on consumer preferences for EVs, with the goal of better informing policymakers and directing future research. We begin by contrasting the economic and psychological approaches to this problem, followed by a conceptual framework of EV preferences that is then used to organise our review. We also provide a brief overview of the modelling methodologies used in the chosen research. Following that, estimates of consumer preferences for financial, technological, infrastructural, and policy aspects are examined. The impacts of relevant elements on consumer choices are then developed by categorising them into groups such as socioeconomic variables, psychological factors, mobility conditions, social influence, and so on. Finally, we present a research agenda for improving EV consumer preference studies and make research recommendations.

### **Objectives of the Study**

Our key objectives to study is to understand that what Indian consumer wants in electric vehicle and which electric vehicle segment in terms of dimension is appealing to Indian consumers.

## FATHER OF INDIAN EV MARKET

### CHETAN MAINI

Chetan Maini is an Indian business tycoon in the electric vehicle sector and the co-founder and vice chairman of SUN Mobility. His most notable achievements include creating REVA, India's first electric vehicle, and founding Reva Electric Car Company Ltd, which is now Mahindra Electric Mobility Limited and for which he served as an advisor.

India's first electric car is called Reva. It is also the least expensive electric vehicle in the nation, costing only 3.7 lakh rupees. In 2008, the business unveiled the Reva I model. Because it is so small, the two-seater car can be parked just about anywhere.



### OWNER REVIEW

In operation since 2008, the Reva I has travelled nearly 71 000 miles. Most of the parts appear to be functioning normally. About 8 hours are needed to fully charge the device. Changing out distilled water has been used to carefully maintain the batteries. Finding technicians who can fix any damage or faults is difficult, though. Overall, the electric vehicle is excellent for city driving on inner-city roads. You can travel at a respectable speed of 60 or 70 Kilometer/hour. The owners have undoubtedly saved a significant amount of money while travelling frequently.

The electric vehicle has a 4.8 kilowatt DC electric motor with a 13.1 kilowatt peak output. A top speed of up to 80 kilometers per hour is achievable. The business has upgraded to a fully automatic drive. There are four options available: boost, neutral, forward, and reverse. Lead-acid batteries are used to power the electric vehicle. IEC 60309 industrial sockets with 16 amp input can be used to charge it. Other features include a music system, adjustable seats, and air conditioning.

### LEADING COMPANIES AS PER 2022

Tata Motors, JBM Auto, Olectra Greentech, Mahindra Electric Mobility, Ola Electric Mobility, Ashok Leyland Electric, Hyundai, Hero Electric, Menza Motors, Lohia Auto, Kia Motors, etc. are the top manufacturers of electric vehicles in India.

Tata Motors is ranked first among the top producers of electric vehicles in India with 2,426 electric vehicle sales in January 2023, an increase of 72.79 percent over the same month in 2022. Following closely behind, MG Motor sold 425 EVs in January 2023, representing a 620.34 % increase from the previous year.

## RESEARCH METHODOLOGY

### SOURCE OF DATA

To Study on "THE MOST APPEALING ELECTRIC CAR SEGMENT TO INDIAN CONSUMER", A Structured questionnaire for collecting primary data. Primary data was collected from 159 respondents.

## SAMPLING METHOD

Convenience sampling method has been used

Our sample size is 159 people of age group of 21 to 50 years.

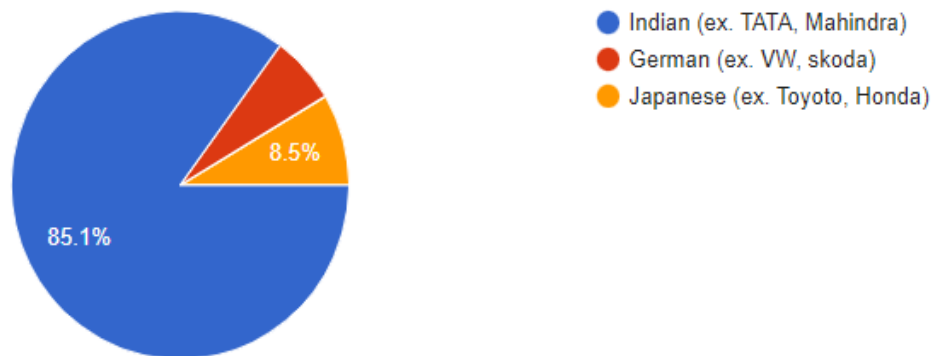
## DATA COLLECTION

**Primary Data:** Questioner, face to face interview, personal observation, field visit

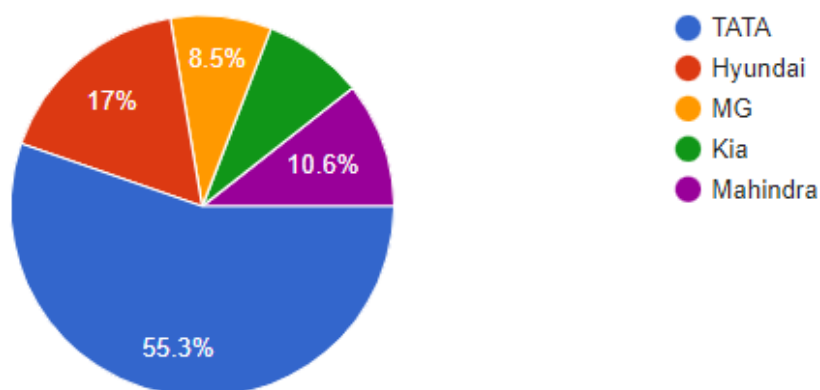
**Secondary Data:** journals, Magazines, Book, Internet etc.

## DATA ANALYSIS

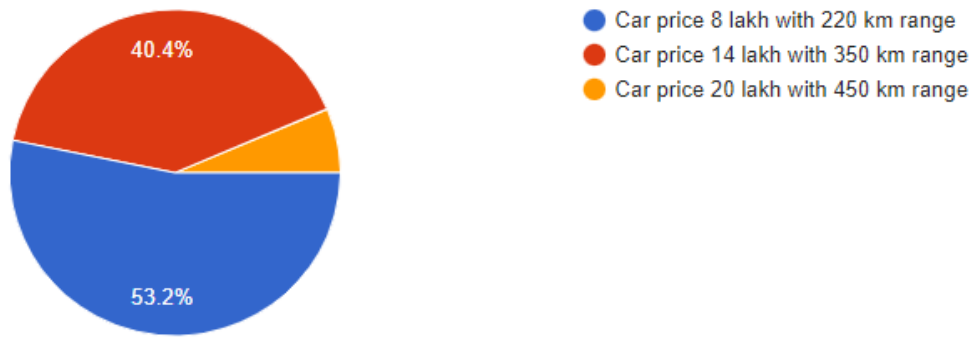
which car brand you prefer to buy?



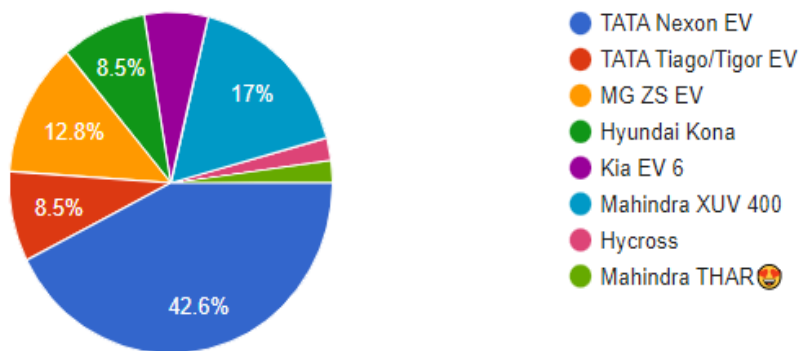
which electric car brand you prefer?



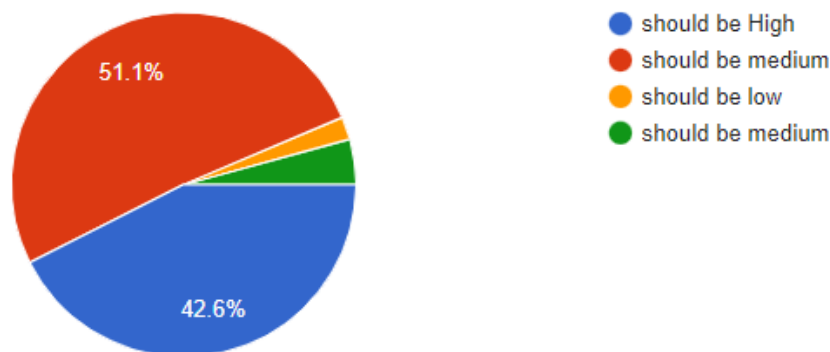
Which kind of car you prefer from below given criteria?



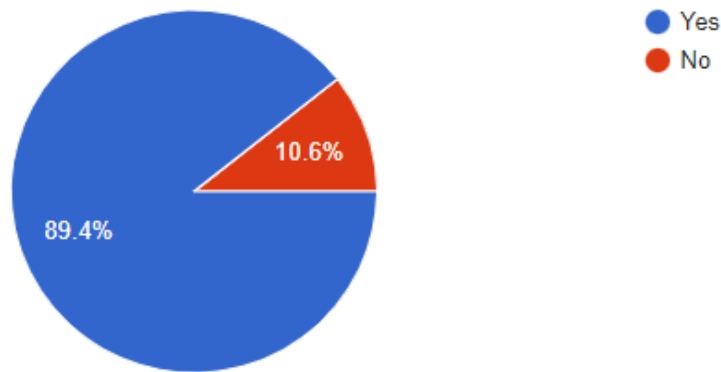
Which electric car you like the most that available in India?



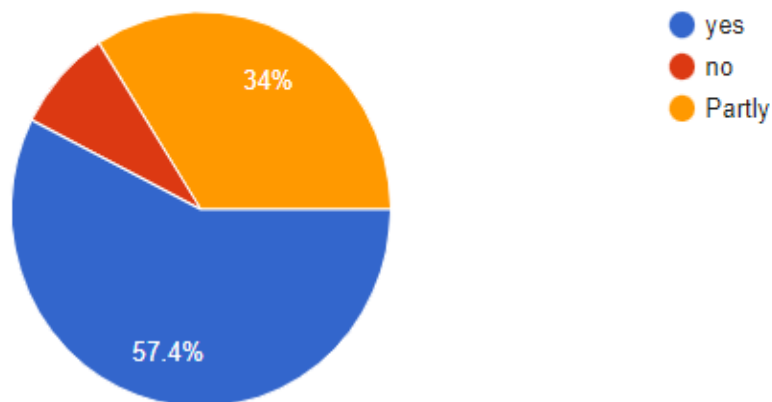
what is your preference about Ground clearance of car?



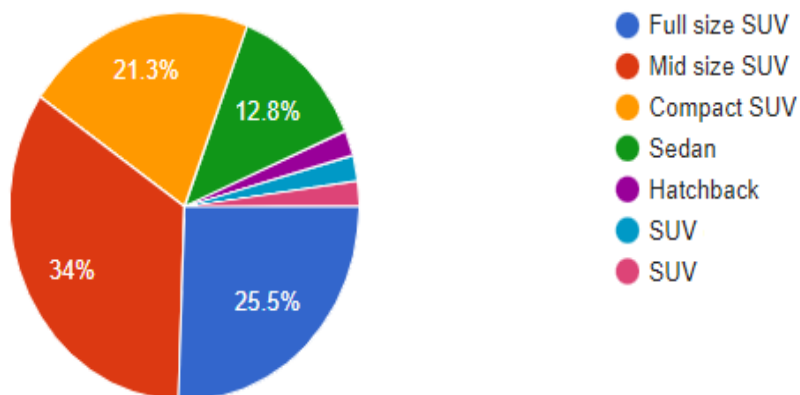
Do you want a higher head room in car?



Do you like off roading?



Which segment you prefer for electric car?



## WHY THIS QUESTIONS?

When it comes to the segmentation of vehicles, there are many different approaches to doing that. Segmentation could be done by brand, by car maker, by expense or by technical dimensions. Here our approaches are with technical dimension because it is the only way to get answered with neutral perceptions.

By the asking questions about the ground clearance, head room, length we able to understand what exactly customer wants to have and also able to know that which segment is more appealing to Indian consumers.

## MOST PREFERED BRANDS IN INDIA

Due to their increased mobility, comfort, and safety, automobiles can improve quality of life. The sector also aids in the development of skills and the creation of jobs. It creates both direct and indirect employment thanks to its numerous forward and backward links.

According to our research 76.3% people preferred Indian electric cars brand.

## GROUND CLEARANCE

How Important Is Ground Clearance? Yes, it does; you don't want a car that constantly runs the risk of colliding with its underside. In addition, Indian roads frequently have a variety of hazards like speed bumps, potholes, unpaved roads, debris, and others. As a result, you must purchase a vehicle with enough ground clearance.

According to our research, 94.4% of people want a medium-to-high level of ground clearance, which directs us towards the SUV (Sports Utility Vehicle) segment in terms of dimensions.

## HIGHER HEAD ROOM

The headroom of a car is the space between the headliner and the head of the occupant. One of the most crucial requirements for good seating comfort and stress-free driving in a car is adequate headroom. When calculating the headroom, standardized body measurements are employed.

According to our research 88.7% people are wants higher headroom space in their car which directs us towards the SUV because SUV's has higher height compare to Sedans and hyzbacks.

## OFF- ROADING

According to our Research 56.6% people are like to do off-roading and 34% people like to do off roading occasionally.

## CONCLUSION

SUVs are becoming more and more popular as a result of their roominess, comfort, and good ground clearance for driving on Indian roads. They also provide better performance and good range. Compared to sedans, SUVs are roomier and more spacious. Everyone can ride comfortably because there is more legroom. SUVs are ideal for camping and road trips because they have this kind of space.

According to market research in electric vehicle market the sales of the SUV's in India is 92.5% of overall sales of EV cars and 82% sales goes to mid size SUV and Compact SUV of the market.