

## “A Study on Consumer Perception of Electric Vehicles in the Maharashtra State: An Analytical Approach for Creating a Future Roadmap”

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### Abstract:

This study aims to understand the consumer perception towards electric vehicles in the Maharashtra, providing an analytical approach for creating a future roadmap. The research focuses on identifying the factors influencing consumer attitudes and preferences towards electric vehicles, and the potential barriers to adoption. ‘Global warming’, ‘Greenpeace’, and ‘Ozone Layer Depletion’ are terms with which almost everyone is quite familiar. As society becomes more concerned with the natural environment, businesses also have to adopt environmental concerns as their corporate social responsibility. Marketing environmentally friendly products is called green marketing. In recent years, the automobile sector has been one of the major reasons behind global warming due to its high carbon emissions. So as a social responsibility, it is necessary to promote green vehicles in the Indian market through automobiles. Industries to reduce its effect on the environment. Green marketing can be considered to be contributing towards enhancing the environmental performance of industry and an important element of the evolution of the Indian automobile industry as it responds to challenges of environmental regulations, increasing customer expectations, and economic pressure. This report, essentially, provides an in-depth study of the consumer’s attitude and perceptions towards green vehicles. It tries to answer fundamental questions that affect the awareness level and preference of consumers to opt for an environment-friendly car over a normal car.

**Keywords:** Consumer perception, Electric vehicles, Economic pressure

### 1.0 Introduction:

The introduction provides an overview of the increasing significance of electric vehicles in addressing environmental concerns and the shift towards sustainable transportation. It also highlights the importance of understanding consumer perception and behavior in shaping the future of electric vehicles in the Nashik region.

“Better overdue than never” is the English saying. With reference to the environmental troubles of the past there is cognizance among people. The continuous exploitation of nature for the past two hundred or more years since industrialization started showing its consequences. In the past, we have seen around the sector unforeseen natural calamities like floods, famines, earthquakes, tsunamis, and many others. The best example of this is the recent flood in Kerala and the landslide in Kodagu (August 2018). Some of the villages certainly disappeared; roads and homes were simply swallowed by way of nature on the wink of a watch. The reasons for the above havoc are nothing but environmental pollution. It is widely recognized that air, water, and soil are infected completely. If we hint at the factors contributing to this environmental pollution at the very outset, we discover two fundamental factors: industrialization and motor motors. According to certainly one of According to the study, seventy-five percent of carbon monoxide emissions come from cars, and in city regions, 50–eighty percent. Indians are finding it hard to breathe in metropolitan cities. Recently, Delhi people suffered plenty because of smog. People could not breathe. Schools had been declared a holiday. A lot of cars collided with each other. Other because of invisibility. People had been stewards, moving around with masks. The Delhi government restricted motor vehicles from getting into the metropolis. This incidence indicates that even CNG (compressed herbal gas) is not an answer to pollution. Knowing that cars are the basis of major pollutants, we ought to discover an answer. Why? Do motors lead to pollution? It’s particularly true when fuel burns in engines, which produces a lot of smoke, particularly in diesel cars. This smoke contains carbon dioxide (CO<sub>2</sub>) and nitrogen (N<sub>2</sub>). The government had attempted to control this emission by making a pollution-loss certificate compulsory on all automobiles. Later, making Euro IV series engines obligatory. The above-stated revelation pressured the authorities to do something in this regard. Now the authorities are wondering if electric cars (EVs) are the best solution for pollutants. Electric automobiles do not cause pollution at all. So in a country, if there is a 100% electric vehicle, 50 to 75 percent of pollution is reduced. It could

be an exquisite achievement. Hence, the government is slowly encouraging the vehicle industry to produce electric automobiles. Also giving incentives and subsidies for electric-powered automobiles. The gift scenario in India suggests it's high time to go for electric-powered cars. In the international marketplace The dollar cost goes up, and at the same time, petrol costs are capturing like rockets. Common Men with meager earnings who've got small vehicles are finding it very difficult to cope. People who are addicted to traveling by using personal cars, especially in cities, do not have the funds for petrol or diesel. Sometime in the past, people sold diesel motors while the diesel fee was notably low. This has brought about further deterioration of the environment. But now the price has become nearly the same. Our top minister's situation is to lessen the import of petroleum. It has many advantages. One of which is that we will lessen our dependence on a few nations that revel in monopolies in petroleum merchandise. Excessive dependence leads to financial slavery. This needs to be curbed for the healthy growth of the country. Secondly, we are able to shop for a lot of foreign exchange by cutting down on petroleum imports. A primary portion of our national profits is spent on buying petroleum products. And whilst the fee for this petroleum product increases within the worldwide market, which will increase the buying country could be the victim. Thirdly, and most importantly, environmental pollutants can be controlled. Our Prime Minister has shown this problem on the international discussion board as well. He has given a name to reducing worldwide warming.

The authorities of India have issued a show-purpose observe to TATA Motors for scraping bulk orders for electric vehicles. TATA was speculated to launch 5000 vehicles in the first segment but failed. It was considered a main setback for the initiative to use the government to replace petrol and diesel cars with electric automobiles. Suzuki has presented a battery plant in India. Its stake is 50% of the percentage. Maruti Suzuki is making plans to release its first electric automobile by 2020. This will be in the shape of a wagon, after which there could be many electric motors made by Suzuki. It targets to sell 50 lakh automobiles by 2030.

Electric vehicles (EVs) have the potential to make contributions to the decarbonization of transportation and the emergence of low-carbon towns due to the benefits of power-green technology and occasional pollution. Thus, it has come to be one of the development traits of interest within the automotive industry. However, the EV enterprise's future achievement is fairly reliant on technological innovation. Many nations, which include Sweden, China, Malaysia, and Korea, have paid close interest to EV-era innovation and issued regulations to encourage EV technological innovation. Nowadays, technological innovation in the electric car subject of sustainable development is an extensive subject matter.

The most essential motive is that, at present, environmental problems have become more and more extreme. Vehicle exhaust fuel emissions have grown to be the most widespread supply of air pollution, in particular in densely populated regions. In order to overcome the environmental and power crisis problems that conventional automobiles make a contribution to, the hybrid electric car (HEV) era has been advanced and applied over the last few years. HEV technologies offer fuel economic system development and enable HEVs to exhaust fewer emissions as compared to conventional inner combustion engine cars (ICEVs), but HEVs cannot absolutely remedy the abovementioned problems. Thus, automobile generation has improved to supply pure electric vehicles (PEVs). As a result, PEV generation ought to reduce greenhouse gas (GHG) emissions and particulate matter (PM2.5) air pollutants, as the sector is tormented by dangerously high levels that pose a major environmental risk to human health. Many studies were conducted to reduce GHG emissions from automobiles. Without GHG requirements, global CO<sub>2</sub> emissions from passenger cars could nearly double between 2000 and 2030. However, if modern GHG requirements are observed, global GHG emissions from passenger motors are predicted to be slightly lower in 2030 than they were in 2000. Based on different research, presently implemented automobile GHG emission standards will reduce 1.7 billion tons of CO<sub>2</sub> emissions from mild-duty motors (LDVs) in 2040, whereas CO<sub>2</sub> emissions from LDVs can be five billion tons in 2040 if GHG emission requirements aren't applied. Sen et al. have anticipated the impact of GHG requirements on the marketplace percentage of electric vehicles (EVs) due to the fact that zero-emission automobiles are much more likely to fulfill GHG requirements, also referred to as the corporate common gas economy (CAFE).

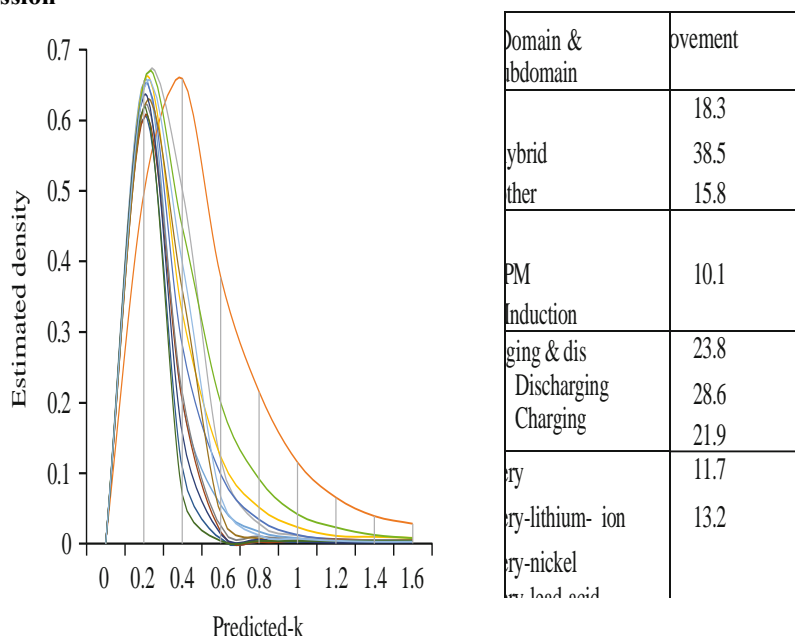
The researchers from exclusive nations used various strategies to assess the environmental effects of EVs. Many researchers have observed that electric automobiles (EVs) can help reduce GHG emissions through a variety of methods. For example, Hawkins et al. determined that during Europe, EVs ought to offer a 10% to 24% reduction in worldwide warming potential while compared to conventional diesel motors. According to Onat et al., all-electric automobile types should help reduce global warming in Qatar. Some students agree that electric cars may not help reduce greenhouse gas emissions. Some researchers deny the real environmental blessings of EVs due to a loss of EV inventory and the power used by EVs being insufficiently smooth. For example, more than 70% of China's electric electricity is generated by burning coal or natural gasoline. The power production enterprise is well-known as a source of air pollutant emissions,

such as sulfur dioxide (SO<sub>2</sub>) and nitrogen oxide (NO<sub>x</sub>) emissions. The source of electricity generation emits a large amount of greenhouse gases, which makes the popularity of EVs seem environmentally unfriendly. The electric-powered vehicle contributes to global warming mitigation if the strength-technology machine is powered by means of renewable and sustainable energy. However, Khan et al. have determined a complete observe on solar-powered electric car charging structures. As a result, from an environmental perspective, EVs remain a promising fashion for decarbonizing transportation and can make contributions to sustainable development.

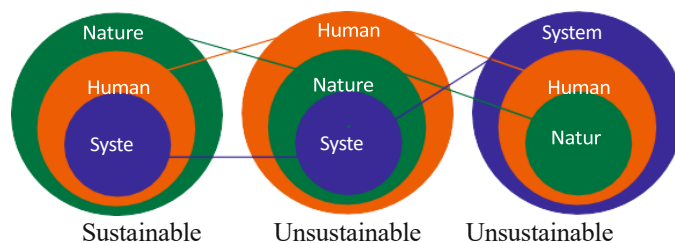
**2.0 Research Methods:**

The research methodology employs a mix of quantitative and qualitative approaches, including surveys, interviews, and focus groups. Data collection and analysis are used to gain insights into consumer perceptions, attitudes, and preferences towards electric vehicles in the Nashik region. The study aims to provide a comprehensive understanding of the factors influencing consumer decision-making and to develop a strategic roadmap for promoting electric vehicle adoption in the region.

**3.0 Analysis & Discussion**



**Figure 1:** The predicted technological development charges of domains and subdomains



**Figure 2:** Models for people, structures, and nature (HNS): (a) sustainable and (b, c) unsustainable. Redrawn from this source.

Charging several networks must be effectively detected, linked, and authorized in order for this application's system screen characters to be shown. The following are the major components of planning a keen system.

- (1) The system's substructure and components must be adaptable.
- (2) The structured grid model should support future growth.
- (3) When planning the structure, consider the structure and points of the programming/device/grid structures.

(4) System updates should be automatic.

Impacts of EV Integration on the Grid. However, this section's information is essential to looking at the impacts of EV integration on the grid. We summarized the effects of blending the EV grid, which can be divided into two categories: terrible and high quality. It is recommended that before connecting EV technology to the grid community, there may be full-size heavy load problems. However, EV generation still wishes to be synchronized with the country-wide grid system Negative Effects. Electric motors are a high-quality test for electricity suppliers. The unnecessary integration of electric vehicles into a decentralized system can affect the shape of the stack, the bounds of the components of the shipping body, tension and repetitive accidents, the injection of higher symphonies, an electricity failure, and financing stability.

Positive Effects although top-degree EV entry into the network can cause issues such as damage to the quality of the degradation, increasing mass, and energy suggestions, each of those troubles can be resolved using government strength techniques.

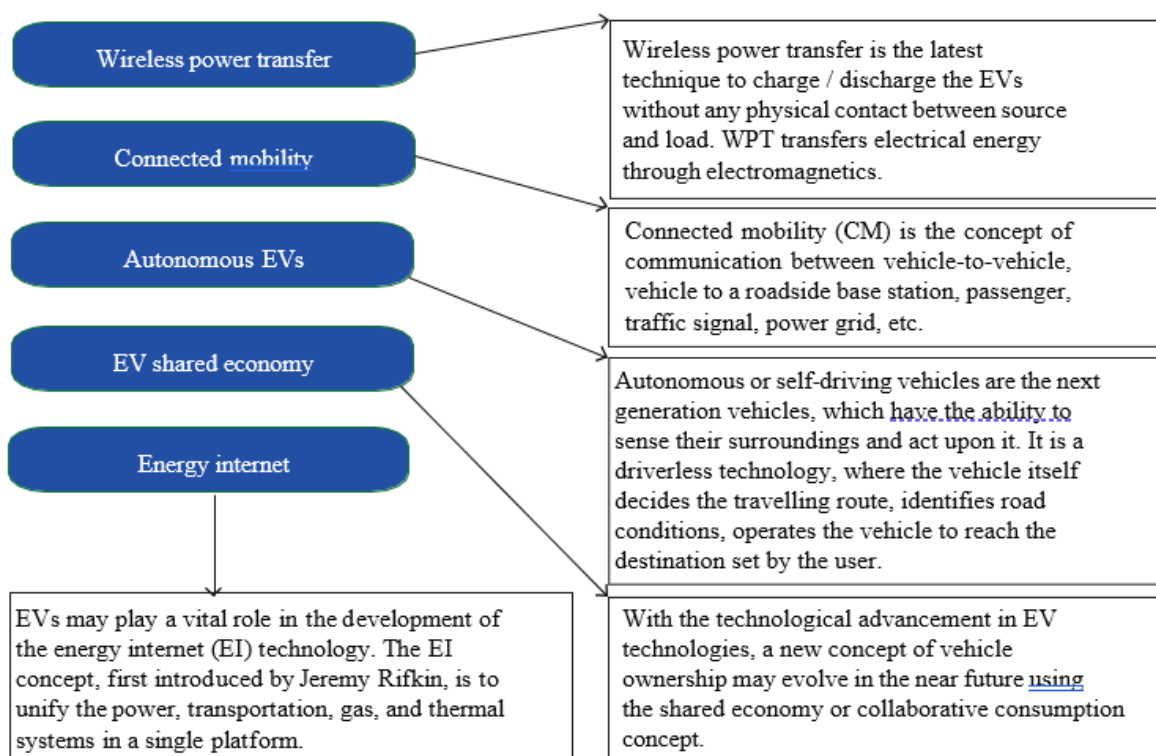


Figure 3: Classification of EV network

Electric vehicles (EVs) have the potential to make contributions to the decarbonisation of transportation and the emergence of low-carbon towns due to the benefits of power-green technology and occasional pollution. Thus, it has come to be one of the development traits of interest within the automotive industry. However, the EV enterprise's future achievement is fairly reliant on technological innovation. Many nations, which include Sweden, China, Malaysia, and Korea, have paid near interest to EV era innovation and issued regulations to encourage EV technological innovation. Nowadays, technological innovation in the electric car subject of sustainable development is a extensive subject matter.

#### 4.0 Conclusion

EVs can efficaciously sell the usage of renewable electricity and decrease environmental pressures on ICE cars. This paper explores EV-associated technology and primary coverage issues to help make EVs a sustainable development. The following conclusions are drawn:

(I) The estimation of EV technology improvement on this have a look at suggests that the better complexity of sustainable development ends in fairly slower EV adoption.

(II) A possible implication for the policymakers encouraging EV development is to difficulty more incentive plans for improvements inside the grid and electric vehicle dating domains.

(III) The generation trajectories of destiny development fashions have been proposed for EV wireless charging and strength networks. This can be a encouraged version for the destiny development of EVs and electricity structures. Moreover, energy electronics for EV integration at the grid have negative influences. The effects inside the paper show that it's time to method EV charging to lessen poor impacts.

(IV) The policymakers found that EVs might be a renewable strength contributor to decreasing CO<sub>2</sub> emissions. However, EV sustainable development needs robust coverage support, which has been proposed in our evaluation paper. We summarized special nations' strategies, strategies, and consequences to provide attention to EV sustainable development although this work offers insight and novel outcomes and discussion about the technological and coverage improvement of EV, there are nevertheless some limitations. For instance, depending on the software, there are two one-of-a-kind varieties of EV. The car is one, and "the bus, truck, and lorry" are the others. Exploring and contrasting the technological tendencies inside the domains of these two sorts is crucial from a utility viewpoint.

We use the not unusual method gadget to decompose the EVs filed in the work, although it presently appears not possible to acquire sustainable development, but these paintings will offer a complete bundle to apprehend obstacles and important techniques to resolve them. Thus, this has a look at offers a number of policy advice to deal with the boom of the EV adoption by using displaying EV uptake and promote the installation of charging stations or act to take away barriers and barriers.

(A) The provincial government offers incentives to EV users, consisting of cash rebates or backed loans, to help them offset the fee of the electric vehicle supply device (EVSE) and its installation in addition to the expenses of the important constructing improvements.

(B) Provide financial assistance to landlords and strata councils with a requirement for a selected variety of charging stations.

(C) Municipal and provincial governments must expand and enforce a program in the next ten years to encourage and provide financial support to strata councils and landlords who broaden retrofit plans and upgrade the energy distribution systems of their homes to satisfy residents' destiny charging desires.

(D) Avoid being overly conservative, that may bring about the useless oversizing of electrical device, and revise and update the regulatory requirements from codes and requirements on a everyday foundation to reflect the maximum recent technological improvements.

(E) To save you destiny situations of unfairness and inequality among them, modify the rights and responsibilities of EV users, constructing residents, strata councils, and landlords concerning the set up and use of charging stations inside multiunit residential homes (MURBs)

(F) Expand the contemporary recommendations to provide precise course and solutions on technical and governance issues like defining ownership and charging infrastructure prices.

(G) Develop a software or guideline to teach and direct strata councils and landlords on a way to create a long-time period EV charging infrastructure plan that will direct and dictate present and destiny charging infrastructure deployment of their building, the want for infrastructure upgrades, and governance and ownership concerns.

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