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Electric Vehicles Opportunities and Challenges in India

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ABSTRACT: INDIA today is one of the top ten automotive markets in the world and given its burgeoning middle class population with buying potential and the steady economic growth, accelerating automotive sales is expected to continue. In the last couple of years, there has been a lot of discussion around the prices of fuel – apart from the deregulation of petrol prices. Moreover the threat of disruption of supplies from the Middle-East has heightened the debate on energy security and brought the focus on to alternate drivetrain technologies.

Like many similar markets, the potential for alternative automotive technologies like electric vehicles (EV) in INDIA depends on factors like improved battery technologies, driving ranges, government incentives, regulations, lower prices, and better charging infrastructure.

Electric technology seems to be something that ICE-reliant manufacturers are eager to incorporate, and not just as an afterthought. Many different regions have also seen the rise of specialised EV manufacturers.

I. INTRODUCTION

Automotive Industry in INDIA

Rising global concerns about fuel conservation and environmental protection have accelerated research and development of electric vehicles. New digital technologies have disrupted the global automotive industry. Rising levels of automation are having an impact on the automobile industry in INDIA as the world readies for a new industrial revolution in the 21st century. Compared to other EV markets around the world, INDIA is unique due to its economic dynamics, market requirements, and consumer preferences.

Understanding the ever-changing nature of this sector will be critical moving forward. Because of these changes, people's ideas about mobility will evolve, creating new opportunities for competition and co-operation. Rising consumer interest in the company's offerings is the primary impetus for the planned growth. Delhi is one of the 20 most polluted cities in the world, so we need to find ways to reduce the pollution caused by cars and trucks. The global auto industry is feeling the effects of the rising popularity of electric vehicles. By the year 2030, it is predicted that electric vehicles, such as BEVs, PHEVs, and other hybrids and plug-ins, will have a significant impact on the automotive value chain in INDIA.

The auto industry in India is shrinking or stagnating, despite the city's large consumer base. With over 3.9 million vehicles manufactured in 2011, INDIA ranks as the sixth largest automaker worldwide.

Chennai, known as the "Detroit of Asia," is already home to much of INDIA's auto industry, and it is projected to become the world's largest auto hub by 2016.

The majority of INDIA's automobile assembly plants are clustered in the region's southern, western, and northern reaches. Chennai and the surrounding southern cluster bring in the most money (35% of the total). The western hub around Mumbai and Pune accounts for 33% of the market, while the northern cluster around the National Capital Region accounts for 32%. Chennai and the Greater Delhi Area are home to the Indian headquarters of numerous international automakers, including Ford, Hyundai, Renault, Mitsubishi, Nissan, BMW, Hindustan Motors, and Daimler.

Chennai is responsible for producing roughly 60% of India's exported automobiles. Gurgaon and Manesar, both in Haryana, make up part of the northern cluster, which is also home to the headquarters of India's largest automaker,

Maruti Suzuki. Manufacturers such as GM, Volkswagen, Skoda, Mahindra & Mahindra, Tata Motors, Mercedes-Benz, Land Rover, and Jaguar are located in the western cluster, not far from Pune in Maharashtra.

automobiles, with lines turning out models branded both with the Fiat name and with the Force Motors name. The expansive Nashik headquarters of Mahindra & Mahindra houses both the UV assembly unit and the engine assembly unit. Audi, Skoda, and Volkswagen are all manufactured in Aurangabad, which is part of the western cluster. Both the GM Halol plant and the upcoming Tata Nano plant in Sanand contribute to Gujarat's status as an industrial centre. There will soon be Ford, Maruti Suzuki, and Peugeot-Citroen plants in the Indian state of Gujarat. In addition to Chennai, Noida, and Bangalore, the city of Kolkata (where Toyota is headquartered) is a major hub for the production of automobiles in India.

Electromagnetic radiation

Prolonged exposure to the electromagnetic radiation produced by high-powered electric motors has been hypothesised to be harmful to human health, but no definitive link has been established at levels below those known to be lethal. Protecting electric motors from electromagnetic radiation with a metal Faraday cage would increase vehicle weight and decrease vehicle speed..

Mechanical

Motors that run on electricity are surprisingly straightforward machines. The efficient energy conversion and finely tuned regulation of electric motors have led to their widespread use. They work in tandem with regenerative braking systems to transform the kinetic energy created by movement into a usable electrical charge. Your car's braking system and brake pads may last longer if you do this. Because of all the stops and starts, regenerative braking is ideal for city driving.

In contrast to internal combustion engines, electric motors can be precisely controlled even when stopped, and they don't require a gearbox. As a result, transmissions and torque converters are unnecessary.

Driving an electric car is much quieter and smoother than a gas-powered car. This quality has its benefits, but it has also raised some

Pedestrians, especially the visually impaired, the elderly, and the young, are at risk when the usual sounds of an approaching vehicle are muffled. Companies and manufacturers are working on fixes, such as alarms that go off if the speed of a driver of an electric vehicle drops low enough for them to hear the road, suspension, electric motor, etc..

Energy efficiency

Electric vehicles are about three times as efficient as conventional internal combustion engine vehicles from the battery to the wheels. This vehicle's energy consumption remains constant even when stopped, in contrast to internal combustion engines, which waste fuel while idling. Electric vehicles' total emissions are lower than those of an efficient gasoline or diesel vehicle in countries where electricity is not generated using fossil fuels, but this is not the case in most countries.

It's important to remember that the efficiency of a fully electric vehicle, from "well to wheel," is determined far more by the method of electricity generation than by the vehicle itself. Any given electric vehicle's efficiency would immediately increase by a factor of two if electricity generation shifted from using fossil fuels to using wind or tidal energy as its primary source. It is important to consider the full scope of energy consumption when talking about things like fossil fuels, from extraction to transportation.

Types of Batteries

Large banks of standard lead-acid car batteries were the norm for powering electric vehicles in the past. Later on, 75 watt hour/kg prototype lithium ion polymer batteries became available. These cutting-edge Li-poly cells can endure up to 130 watt-hour/kg of power and have a charging cycle life of thousands of charges.

Efficiency

Emissions associated with different charging strategies have been estimated using a number of approaches. Both plug-in hybrids and all-electric cars have unique fueling routines.

Range

The range of electric vehicles is typically shorter than that of gasoline-powered vehicles because batteries store less energy per unit. When compared to filling up a petrol tank, recharging an electric vehicle can be a time-consuming ordeal. The fact that convenient public charging stations are so hard to come by at the moment only serves to increase the level of difficulty. Consumer concerns about the range of an electric vehicle are often referred to as "range anxiety."

II. OBJECTIVES OF THE STUDY

- Production and sales trends of automobiles in the INDIA region are examined.
- To conform to INDIA's stringent emission regulations.
- Studying how other countries' driving laws differ from one another.
- The vehicle standards will be based on the energy efficiency of light-duty vehicles.

III. LITERATURE REVIEW

- According to Holms et al., recent transportation improvement efforts have prioritised environmental friendliness and safety (2010). It has been proposed that conventional vehicles will eventually be phased out in favour of electric ones, so researchers in many countries have been studying financial incentives and consumer socioeconomic factors to figure out how to increase electric vehicle adoption. Hybrid vehicle interest in several major INDIA cities was analysed. Financial incentives have been established by policymakers in many countries to promote the widespread adoption of electric vehicles (Sierzchulaet al 2014, X Zhang et al 2014). Ecological concerns have become more pressing as fossil fuels are used up.
- Debabrata Das et al. (2011) described the potential need for the design and implementation of a small electric concept vehicle for INDIA based on their findings and argued for its development.
- An excellent summary of the fundamentals involved in designing a PHEV is provided by Bradley and Frank's (2009) study of the topic. This includes the architecture, energy storage trade-offs, energy management system, drive train component functions, and grid connections. Adding electric vehicles to the transportation system may help regain some of the inefficiency that has been lost. The majority of this effort will be devoted to improving and repairing our road system to lower the number of traffic accidents, raise worker output, and lessen environmental damage. However, many groups are worried about the negative effects these innovations may have on people and the environment due to the rise in vehicle traffic that will inevitably result from their widespread adoption.
- Because they reduce the demand for fossil fuels, mitigate the effects of ozone-depleting chemicals, and boost the adoption of renewable energy, electric vehicles can be a useful tool in the fight against greenhouse gas emissions, as discussed in AN Saqlain Ali's 2012 paper, "A review on barrier and challenges of electric vehicle Indiaand vehicle to grid optimisation." There is a lot of information out there about electric vehicles, but many people still have questions about them.
- In 2008, Qiang et al. conducted the first in-depth examination of PHEVs. An adaptive algorithm is used to calculate the battery's SOC in a hybrid electric vehicle.
- 2. The adaptive algorithm's high robust property and noise-immune ability make it a good fit for use in Hybrid electric vehicle applications.



- Villalobos et al study 's of PHEVs is brilliant in more ways than one.
- An electric vehicle charging algorithm is described.
- Using this new method, connecting electric vehicles to a low-voltage power grid is simplified, which is beneficial to all parties involved.

IV. METHODOLOGY

The primary goal of the research was to provide answers to questions about the EV/HV industry and to satisfy people's thirst for knowledge. If you are interested in learning if the market is fully saturated,

Components That Are Crucial

We got it from the horse's mouth, so to speak. The selected sampling units form the backbone of the data collection process.

Number of Subjects in a Research Sample

Fifty people were selected at random to take part in the study.

Techniques for Collecting Samples

The required participants were chosen using a random sampling process.

Tools and Techniques

Primary Data Collection Techniques

Research Strategies

There were a total of 16 multiple-choice questions on the survey. In order to create this survey, we used the Electronic Survey Form googledocs template. The form could be emailed to many people quickly and easily. The Survey was also very easy to share on various social media sites.

Observation

The online survey was completed by a larger percentage of the population because it was more practical for them to do so.

V. LIMITATIONS

The survey will only cover the nearby areas.

Because of the author's biases, male readers make up the bulk of the target demographic.

Finally, the primary audience served is comprised of people in their twenties and thirties, as these are the ages of the author's contemporaries.

Four, even if you've already answered "no" to some of the survey questions, you can still take part in the rest of them.

Because careless people are responding to the survey, each question will have exactly 100 responses.



RECOMONTATION

The following are some of the recommendations made by this study for increasing the number of people who drive electric cars:

The results suggest that businesses can increase their market share by offering discounts and other financial incentives to customers. In order to boost sales, it is recommended that businesses work with governments, banks, and other financial institutions to make affordable auto loans available to middle-class consumers.

Third, today's youth are committed to environmental sustainability and often serve as family leaders. This is a great way for businesses to market their cars to students, and they should consider offering additional deals to those who are still in school.

If the government and the auto industry are serious about increasing sales of electric vehicles, they need to do more to spread the word.

Consumers in INDIA still have a lot of questions about electric vehicles, charging, and where to find service stations. Businesses in the area can start free awareness campaigns with their dealers to help with these problems. The rising cost of gasoline and diesel has piqued consumer interest in fuel-efficient, environmentally friendly vehicles.

Referring to Previous Works

These are not datasets compiled by the researcher themselves, but rather datasets that already exist. Both internal and external data sources could be used. Information about the company can be gleaned from secondary sources. When, where, and why the business was first established. Secondary sources fill in all the blanks left by primary data.

A Look at Some Alternative Data Sets

Research papers, the Internet, newspapers, and reports were heavily utilised.

VI. CONCLUSION

Our ability to draw conclusions from our research was greatly aided by the positive and consistent feedback we received from the surveys.

Because most people still don't know about all the different kinds of Alternative Technologies that go into making cars, the public's perception of EVs has not changed.

The current market for electric vehicles has failed to meet consumers' high expectations.

Although many government organisations already exist and many plans have been proposed, the process of putting them into action has only just begun.

Only if electric vehicles are priced similarly to the ones people are used to driving, will there be a shift in consumer preferences. They need to be taught the importance of green technology as it continues to expand.

While some buyers may not be ready to consider alternative fuel vehicles, others will find many options, such as the REVOLVO KIT, to meet their requirements.

It is crucial to raise awareness about such products in order to create a GREENER ENVIRONMENT.

Businesses, as part of their CSR efforts, should be at the forefront of the movement towards electric vehicles.

Battery-powered and plug-in hybrid vehicles have a promising and eco-friendly future.



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