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CONSUMER'S PURCHASE INTENTION OF ELECTRIC VEHICLES IN INDIA

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ABSTRACT

Advances in environmentally friendly sustainable mobility technology, such as electric vehicles, are regarded as critical approaches to reducing greenhouse gas emissions via the automotive sector. However, the adoption of electric vehicles isn't happening at the desired rate in India, though it is expected to increase in the future years. Several car manufacturers are stepping up manufacturing of electric vehicles. The objective of this research is to understand the consumer behaviour toward electric cars, state of electric cars in globally and in India influencing the intention to adopt electric vehicles. This study provides useful information regarding the initiatives, schemes, and programs introduced by the government in order to promote the expansion of the EV sector. The study adds to the current scenario of the EV sector in India. In practice, the findings of this study can help policymakers and planners enhance the pace of the adoption of Electric Vehicles.

Keywords: *Electric Vehicles, Eco-Friendly, Consumers' Purchase Intention.*

Introduction

India is one of the most polluted nations in the world, and transportation is a vital source of pollution. According to an IQAir analysis, India is the eighth most polluted country in the world, with New Delhi ranking second in terms of average PM 2.5 pollution. As Electric cars produce zero tailpipe emissions, it helps in improving air quality and reduction in health risks caused due to pollution. Cost of oil happens to be volatile and India is an importer of oil. According to independent research conducted by the CEEW (Council on Energy, Environment, and Water), if electric cars (EVs) account for 30% of new vehicle sales by 2030, India may save over INR 1 lakh crore (USD 14 billion) in crude oil imports. By shifting customer's focus toward Electric cars government can reduce their dependency on oil, which will ultimately save costs and will make the country more energy secure. The objective of this research is to understand the consumer behaviour toward electric cars, state of electric cars in globally and in India influencing the intention to adopt electric vehicles. This study provides useful information regarding the initiatives, schemes, and programs introduced by the government in order to promote the expansion of the EV sector. The study adds to the current scenario of the EV sector in India. In practice, the findings of this study can help policymakers and planners enhance the pace of the adoption of Electric Vehicles.

Consumer behaviour toward Electric Cars

As per Fuels Institute, there are a group of trends that guide a customer to purchase: familiarity, availability, and affordability are among the key factors that influence the purchase decision of Electric vehicles (EV). According to Kalibrate, the lack of charging stations has been a major concern for car drivers. With increased awareness, a stunning 83% of 2W respondents and 69% of 4W respondents want to use EVs as their primary car. 10% of 2W respondents and 6% of 4W respondents showed a propensity to buy an electric car as their future vehicle. In terms of meeting customer demands, 62% of 2W respondents & 55% of 4W respondents believe EVs may replace traditional automobiles. The responsible for the environment approach, along with a conviction for EV usage, has resulted in a strong potential for 33% of 2W respondents & 32% of 4W respondents to purchase an EV within the next year.

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There are 3 latent variables that represent the perceived advantages of Electric Vehicles (EVs). First is *design* which includes consumer perception towards aesthetic & functional features including reliable performance, efficiency, and prestigious style. Second is the *environment* which indicates the perceived environmental effects of EVs and the last one is the *safety* which reflects on perceived capacity in Electric Vehicles to reduce incidents and accidents. Employment level and education somewhere increases the perceived advantage of Electric vehicles. Recharge Time, price, and operating and set-up costs are factors that exert a negative impact on the preference for Electric Vehicles however driving range put forth a positive impact. (Ghasri M., Ardeshri A., & Rashidi T., 2019). Results from emotions and normative-based theories emphasis more on behaviour aspects, as per these theories individuals might express pro-environmental behaviour (like purchasing an EV) for hedonic and emotional reasons (like the feeling of pleasure), for gain reasons (like saving money), and normative reasons (like the feeling of doing right). (Steg et al., 2014). In another study, it was found that such pro-environmental behaviours (like obligation to limit environmental consequences for car driving) can trigger a positive emotion (like excitement) towards the adoption of Electric vehicles. (Rezvani et al., 2018). Brands that emphasise these sorts of motives may result in a more favourable brand perception. Findings from lifestyle and identity-based theories perceive that interest in EVs could be associated with pro-environmental individual characteristics like taking distress for the environment, having biospheric values, and engaging in a lifestyle that is environment oriented. (Axsenet al., 2015, 2018). Some studies found that individuals who have a high score on having a trait of innovativeness and those who are technology-oriented are more interested in EVs. (Hardman et al,2017). An automotive brand that is identified as being pro-environmental, innovative, or both may have a greater favourable effect on consumer impressions of EVs. According to Deloitte's "2023 Global Automotive Consumer Study" conducted in India EVs continue to gain attraction on the belief that their fuel prices are much cheaper than ICE automobiles, outweighing concern about climate change.

State of EV: Globally & in India

To know the future impact of EVs, one must know its present scenario. Presently more than 80,000 EVs across different types of transport vehicles are in stock in the year 2022. (Chart 1). This is about to increase in the following years with the development of government initiatives towards cleaner transportation and technology. India, China & Brazil, emerging economies are nowadays putting emphasis on EVs to counter the challenge of environmental deterioration. (WU and Zhang, 2017). All these countries are very much the same in terms of the way they make advancements or progress, but Brazil is not considered as progressive as the other two in the context of Electric vehicle policy. (Baran and Legay, 2013). China has been increasing its EVs in the market which depicts its intention very clearly. In India, the government is taking initiatives to promote EVs. NITI Aayog (2018), considered as government of India's policy think tank has placed the Electric vehicle policy at the centre. The document outlines factors consisting facilitate customer adoption, a major impetus for development and research, decrease in oil consumption, ensure utilization by common people, decrease in pollution and obtaining global competitiveness while empowering employment of EVs. China has the highest global percentage of Electrical vehicles at 45%. In India demand for 2-wheelers and commercial electric vehicles are high. In India, 2-wheelers have around 94% contribution to the Electric Vehicle sector. MNRE (Ministry of New and Renewable Energy) has issued a policy for EVs of ₹ 950 million subsidies.

An increasing number of automobiles in the market has made India face challenges like the degradation of the environment and increased congestion, which led to the reliance of India on other countries for fuel import. This somehow emphasised the requirement of unconventional traditions of fuelling vehicles. (Digalwar and Giridhar, 2015). National Electric Mobility Mission Plan to counter challenges that have arisen due to growing vehicle traffic on Indian roads highlighted the inclusion of EVs attached with plug-in hybrid and hybrid technology. (Saxena et al, 2014). Out of a total of 3.4 million cars sold in the year 2018, 3,000 of them were EVs, which indicates that there is a need for further push to empower people to purchase EVs. (Afonso, 2020). For the production of Electric vehicles, there is a need for certain chemicals like lithium, which is required to prepare battery cells and cathodes for electric cars, which led to India relying on China for the export of such substances. (Afonso, 2020).

In the financial year 2019, the automobile sector witnessed sluggish growth, BS-VI norms that are expected to be implemented in the year 2020, might help the sector to revive itself. This will make the rate or price of EVS more competitive. (Narasimhan, 2019). According to the current state of the industry, the market share of EVs is just 1% of total vehicle sales which indicates that EV adoption must progress beyond its current state.

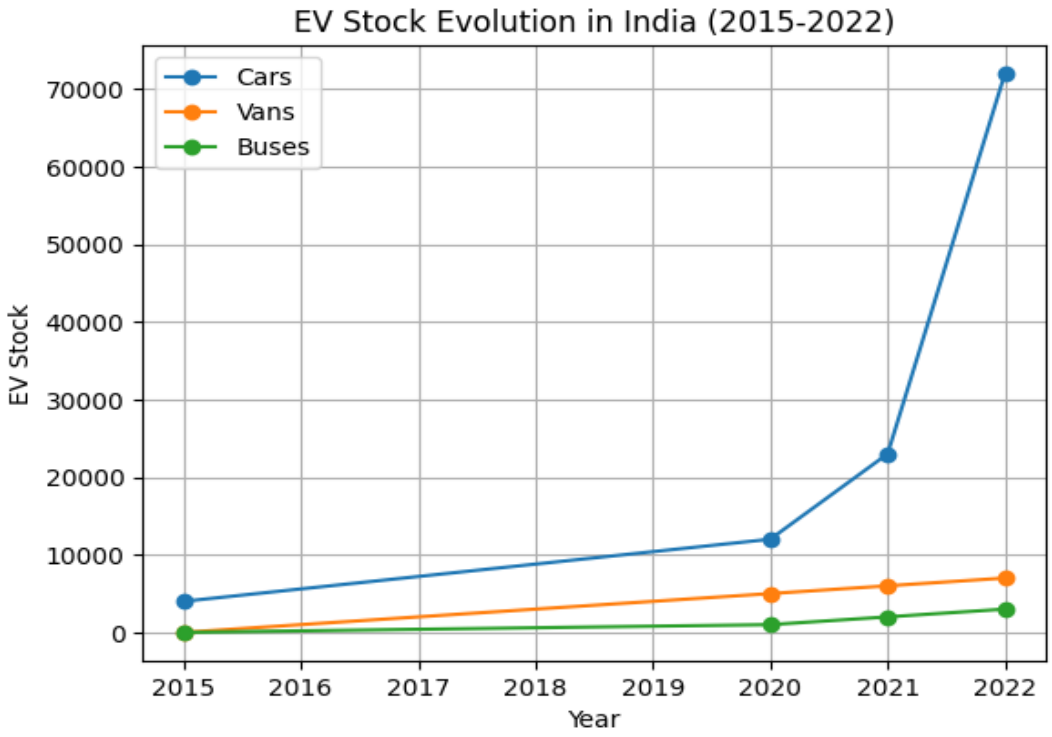


Chart 1: Historical evolution of Electric vehicle stock in India, 2015 to 2021

Source: International Energy Agency (IEA) 2023, Global EV Outlook 2023. IEA (2022), World Energy Outlook 2022

Role of Government

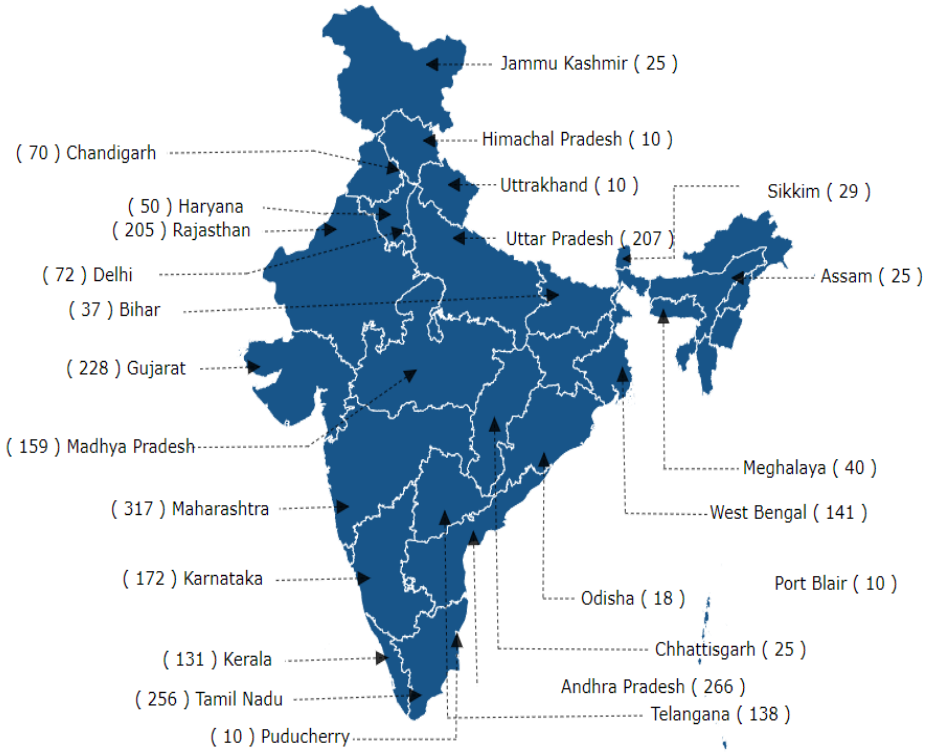
Source: e-amrit, Niti Aayog, Government of India

FAME I and II

Faster Adoption and Manufacturing of (Hybrid and) Electric Vehicles or FAME, is now India's premier electric mobility promotion initiative. DHI (Department of Heavy Industries) introduced it in 2015. FAME-II is currently in its second phase of implementation and will last three years, beginning on April 1, 2019, with a budget of Rs 10,000 crore, including a Rs 366 crore overflow from FAME-I. The plan provides the following incentives:

- For 2-wheelers: ₹ 15,000 per kWh up to 40% of vehicle cost (2 kWh - Battery's Approximate size)
- For 3-wheelers: ₹ 10,000 per kWh (5 kWh - Battery's Approximate size)
- For 4 wheelers: ₹ 10,000 per kWh (15 kWh - Battery's Approximate size)
- For E Buses: ₹20,000 per kWh (250 kWh – Battery's Approximate size)
- E- Trucks: ₹ 20,000 per kWh

Under scheme FAME phase II, DHI has authorized 2636 charging stations across 62 cities, and 24 UTs/States. The following map of India showcases the allocation of charging stations State-wise:



Source: e-amrit, Niti Aayog, Government of India

(PMP) Phased manufacturing Programme

A phased manufacturing roadmap was developed, taking into consideration the manufacturing ecosystem's current state in the country for the enhancement and promotion of the development of electric mobility. In this program by following a graded duty structure manufacturing of EVs, their assemblies, sub-assemblies, parts, subparts and inputs will be promoted.

National Mission on Transformative Mobility and Storage

Its aim is to drive strategies for EVs, their components and batteries PMP and transformative mobility. The key roles, roadmap and impact under this mission are specified below:

Role

- Drive strategies for EVs, their components and batteries PMP and transformative mobility.
- Creating PMP (Phased Manufacturing Program) to localise production throughout the entire value chain of EVs
- The mission will finalise localisation details with a well-defined Make in India plan for EV components and batteries.
- The Mission will work with key stakeholders in Ministries, Departments, and States to combine diverse programmes aimed at transforming mobility in India.

Roadmap

- PMB roadmap will initially in the year 2019-20 will focus on large-scale pack assemble and modules and by the year 2021-22 they will focus on giga-scale integrated cell manufacturing.
- Through PMP, the battery manufacturing sector in India would flourish in a holistic and complete manner.
- Preparing a path to allow India to harness its size and scale to create new, competitive multimodal mobility solutions. These solutions could be applied internationally in a variety of situations.
- The promotion of Make-in-India and establishment of a sustainable mobility ecosystem and the promotion of Make-in-India to create a roadmap for "New India" transformative mobility.

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