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Economic Implications of India's Push for Electric Vehicles

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Abstract: India's ambitious push for electric vehicles (EVs) marks a significant step toward achieving sustainability, energy independence, and economic growth. This paper investigates the economic implications of this transition, focusing on its impact on manufacturing, employment, and related industries. It explores the evolution of the automotive manufacturing ecosystem, emphasizing the shift toward localized battery production, advanced technologies, and green supply chains. The analysis also examines the employment landscape, addressing both the opportunities created in emerging sectors and the challenges posed by job displacement in traditional automotive and fossil fuel industries. Additionally, the study highlights the role of government policies, infrastructure development, and investment trends in shaping India's EV future. This transition is framed as both a challenge and an opportunity to promote long-term economic resilience and enhance global competitiveness.

Keywords: Electric Vehicles, India, Economic Implications, Manufacturing, Energy Sector, Employment, Environmental Impact.

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1. Introduction

Background India's transportation division is experiencing a change with the government's driven objective to advance electric versatility. Activities such as the Speedier Appropriation and Fabricating of Crossover and Electric Vehicles (Popularity) conspire and the National Electric Versatility Mission

Arrange (NEMMP) 2020 emphasize the government's commitment to diminishing reliance on fossil powers, diminishing contamination, and cultivating economical financial development.

Objective The objective of this think about is to analyze the financial suggestions of India's thrust for electric vehicles. This incorporates assessing the impacts on diverse segments such as fabricating, business, vitality, and the environment, and recognizing the key challenges and openings related with this move.

Hypothesis The selection of electric vehicles will lead to a noteworthy increment within the request for power in India, requiring ventures in vitality framework. The move to electric vehicles will emphatically affect the business scene by creating unused occupations within the EV fabricating and subordinate businesses, in spite of the fact that it may moreover lead to work misfortunes in conventional car divisions. Electric vehicle appropriation will result in a considerable diminishment in nursery gas outflows, contributing to move forward open wellbeing and natural quality in India.

2. Review of literature

This review evaluates scholarly articles, policy papers, and industry reports to analyze the economic implications. Kumar et al. (2023) localized manufacturing of EV components, including batteries and motors, can create jobs in production, assembly, and maintenance. However, this requires substantial investment in workforce training. Pillai and Gupta (2021) highlight high initial cost, argue that EVs remain expensive compared to Internal Combustion Engine (ICE) vehicles due to high battery costs. Subsidies under FAME-II have mitigated some costs, but long-term financial viability depends on technological advancements. Singh and Rao (2022) lack of charging infrastructure hampers EV adoption, the absence of widespread and affordable charging facilities slows consumer uptake, limiting economic growth potential. Devi and Palaniswamy (2024) transitioning to EVs could lead to environmental sustainability but impose short-term economic costs, such as reallocating resources from traditional auto manufacturing. A cost-benefit shows long-term gains in GDP and energy independence outweigh these initial setbacks.

3. Main results

Over the past few years, India's electric vehicle (EV) market has experienced significant growth across various segments, including two-wheelers, three-wheelers, and four-wheelers. Here's an overview of the sales trends from 2020 to 2024:

Electric Vehicle Sales Trends in India (2020–2024)

1. Electric Two-Wheelers (E2W)

YEAR	UNITS SOLD
2020	152,000
2021	233,000
2022	620,000
2023	920,000
2024	1,000,000+

2. Electric Three-Wheelers (E3W)

YEAR	UNITS SOLD
2020	90,000
2021	140,000
2022	210,000
2023	590,000
2024	694,466

3. Electric Four-Wheelers (E4W)

YEAR	UNITS SOLD
2020	3,000
2021	5,000
2022	17,800
2023	50,000
2024	99,848

4. Total EV Sale

Year	Units Sold
2020	245,000
2021	378,000
2022	847,000
2023	1,600,000
2024	2,000,000+

These trends highlight the rapid adoption of electric vehicles in India, driven by increased consumer awareness, government incentives, and advancements in EV technology

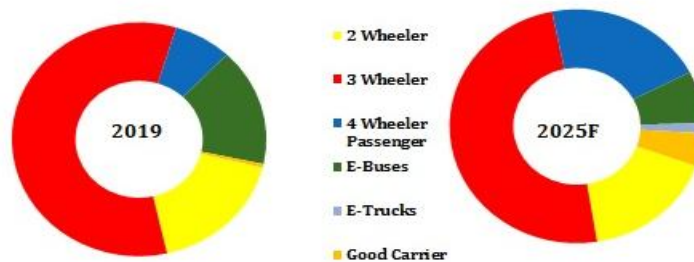


Figure 1: Indian Electric vehicles market revenue share, 2019-2025.

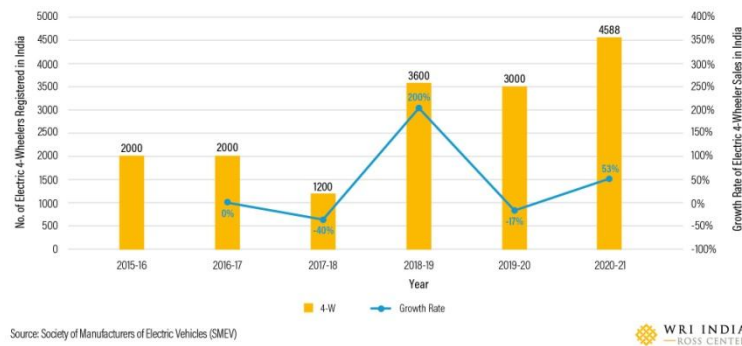


Figure 2: Trends of electric cars sales in India

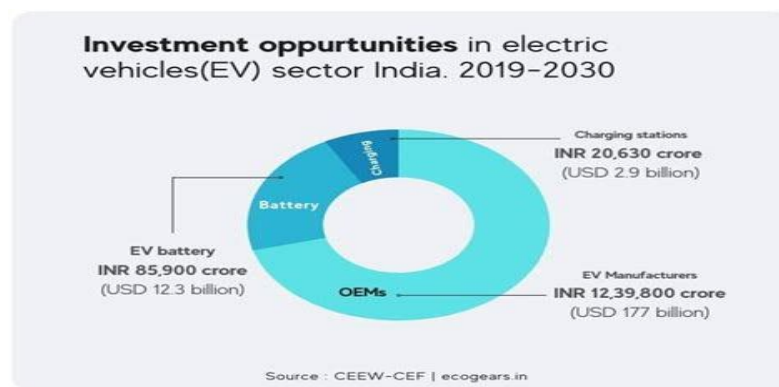


Figure 3: Investment Opportunities In India

4. Result discussions

These comes about adjust with past ponders that have recognized that Electric Vehicles (EV) has picked up noteworthy footing in later a long time as a cleaner and more effective to tradional gasoline-powered cars. Thus, with progressed in battery innovation, a developing organize of charging framework and expanding shoppers request, Electric Vehicles have gotten to be accessible choice for numerous drivers around the world.

From over discoveries it has been seen that India is the third biggest vehicle showcase universally in terms of deals, ahead of Germany and Japan. There's presently thrust for producers and policymakers to collaborate to move request towards greener option. Be that as it may, there's differentiate a few Challenges and Openings:

Infrastructural Improvement

One of the greatest challenges to EV selection in India is the need of charging framework. Tending to

this will require facilitated endeavors between the government and private segment, with critical speculation in both urban and country regions.

Approach and Administrative System

The victory of India's EV thrust will to a great extent depend on the viability of its approach system. This incorporates motivations for customers, appropriations for producers, and controls that empower the advancement of supporting foundation

Market Accepted Obstructions

Challenges such as tall forthright costs of EVs, extend uneasiness, and constrained demonstrate accessibility are noteworthy barriers to buyer appropriation. Be that as it may, as innovation progresses and economies of scale are accomplished, these boundaries are anticipated to decrease.

5. Conclusion

In this paper, the study consider from different discoveries and encounters affirms that India's thrust for Electric Vehicles has noteworthy financial suggestion with potential benefits in terms to decreased fossil powers imports and deliberately driven to work creation, vitality supply request and positive natural affect. Consequently, generally thrust for Electric vehicles gives long term financial benefits. Be that as it may, noteworthy challenge remains requiring facilitated endeavors from the government, industry and customers.

To maximize the financial benefits of EV selection, the study suggests focused on arrangements that back infrastructure improvement, incentivize customer appropriation, and advance nearby fabricating of EV components.

Future inquire about may center on the long-term supportability of the EV showcase in India, the integration of renewable vitality with EV foundation, and the socio-economic impacts of the move on diverse populace sections.

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