

E-Vehicles and India: A SWOT Analysis

Mr. Annasaheb. B. Wasekar

Assistant Professor

Dept of Economics

Vivekanand College, Kolhapur (Autonomous)

Mob No: 9011787006

Abstract: This research paper was written in the view of emerging market of e-vehicles in Indian economy. This paper mainly focusses on the emerging market condition which was going to flourish for e-vehicles segment. The paper was mainly focus on SWOT analysis on e-vehicle industry which is growing faster than traditional auto industry. consist of information regarding

Key-wards: e-vehicle, green economy, pollution, Automobile industry

Introduction

India a diversified country with richest persons as well as words biggest slum area and approximately 30% malnutrition rates. India also known for diversified customers who are ready to buy cheapest goods as well as expensive goods and services. When we go into detailed in the different sectors of Economy, we get very extraordinary and eye-opening data and facts. For this research paper I am selecting the well-known sector of Indian economy that is automobile industry. India became the third largest auto market in 2023 was a watershed year for the Indian auto industry as it surpassed Japan and Germany to become the third-largest automobile market in the world by sales volumes. It was the seventh largest manufacturer of commercial vehicles in 2018. The Two Wheelers segment dominates the market in terms of volume owing to a growing middle class and a young population. Moreover, the growing interest of the companies in exploring the rural markets further aided the growth of the sector. India is also a prominent auto exporter and has strong export growth expectations for the near future. Automobile exports grew 14.50 per cent during FY19. It is expected to grow at a CAGR of 3.05 per cent during 2016-2026. In addition, several initiatives by the Government of India and the major automobile players in the Indian market are expected to make India a leader in the two-wheeler and four- wheeler market in the world by 2025

On 17 August 2017 Minister of state for power and renewable energy Piyush Goyal said the central Government is preparing a road map to ensure that only electronic vehicles will be produced and sold in the country by 2030. So, it is important to analysis has to be done for the current status of economy which is going to be changed by this announcement. In this research paper I am trying to be carried out SWOT analysis of Indian economy regarding electric vehicles.

OBJECTIVES:

1. To clear the concept of e-vehicle
2. To analyses the current status of automobile industry
3. To find out strength, weaknesses, opportunities and challenges faced by economy

Source of Data

This research paper is descriptive and informative regarding e-vehicles and Indian economy. For analysis the secondary data was used from government reports, websites and journals

Current status of Indian automobile industry

- India became the fourth largest auto market in 2018 with sales increasing 8.3 per cent year-on-year to 3.99 million units. It was the seventh largest manufacturer of commercial vehicles in 2018.
- The **automotive industry in India** is the third-largest by production in the world as per 2023 statistics as of 2023, India is the *3rd largest automobile market* in the world in terms of sales. In 2022, India became the fourth largest country in the world by the valuation of its automotive industry.
- The contribution of this sector to the National GDP has risen to about 7.1% now from 2.77% in 1992-93. It provides direct and indirect employment to over 19 million people. In the automobile market in India, Two-wheelers and passenger cars accounted for 77% and 18% market share respectively during the year 2021-22. Passenger car sales are dominated by small and mid-sized cars. Export of the total number of automobiles increased from 4,134,047 in 2020-21 to 5,617,246 in 2021-22, registering a positive growth of 35.9% India aims to double its auto industry size to Rs. 15 lakh crores by end of year 2024. There has been an FDI inflow of \$33.77 billion in the industry from April 2000 till September 2022 which is around 5.48% of the total FDI inflows in India during the same period.
- The Two Wheelers segment dominates the market in terms of volume owing to a growing middle class and a young population. Moreover, the growing interest of the companies in exploring the rural markets further aided the growth of the sector.
- India is also a prominent auto exporter and has strong export growth expectations for the near future. Automobile exports grew 14.50 per cent during FY19. It is expected to grow at a CAGR of 3.05 per cent during 2016-2026. In addition, several initiatives by the Government of India and the major automobile players in the Indian market are expected to make India a leader in the two-wheeler and four-wheeler market in the world by 2020

Market Size

- Overall domestic automobiles sales increased at 6.71 per cent CAGR between FY13-19 with 26.27 million vehicles getting sold in FY19. Domestic automobile production increased at 6.96 per cent CAGR between FY13-19 with 30.92 million vehicles manufactured in the country in FY19.
- In FY19, year-on-year growth in domestic sales among all the categories was recorded in commercial vehicles at 17.55 per cent followed by 10.27 per cent year-on-year growth in the sales of three-wheelers.
- Premium motorbike sales in India crossed one million units in FY18. During January- September 2018, BMW registered a growth of 11 per cent year-on-year in its sales in India at 7,915 units. Mercedes Benz ranked first in sales satisfaction in the luxury vehicles segment according to J D

Power 2018 India sales satisfaction index (luxury).

Types of e-vehicles in India

There are four types of electric vehicles available in Indian market

1. Battery Electric Vehicle (BEV)
2. Hybrid Electric Vehicle
3. Plug-in Hybrid Electric Vehicle (PHEV):
4. Fuel Cell Electric Vehicle (FCEV)

Electric vehicle sale in India

Year	Units Sold	% Growth
2013	2693	*
2014	2392	-11.12
2015	7772	224.95
2016	49065	531.22
2017	86120	75.52
2018	127256	48.13
2019	163459	28.12
2020	121459	-25.57
2021	322871	165.40
2022	999949	209.70
Data Source: https://vahan.parivahan.gov.in		

Government Policy/Initiative for e-vehicle Market

- The Government of India consistently demonstrates its commitment to establishing India as a worldwide leader in the EV industry by introducing Initiatives for electric vehicles. The government has developed several programmes and incentives to increase demand for electric cars and to encourage manufacturers to engage in the R&D of electric vehicles and related infrastructure. Electric cars are the driving force behind the transition to electric transportation.
- The government is implementing cheaper road fees, scrapping, and refit incentives to help meet the government's aim of 30% EVs by 2030. The growing expense of oil imports, rising pollution, and India's worldwide duties to tackle climate change are driving reasons behind the country's recent initiatives to expedite the transition to e-mobility.
 - The government is promoting the installation of EV charging stations by providing capital subsidies through the FAME India Programme Phase II and state-level measures. So far, the Indian government has announced the following incentives.
 - FAME-II
 - PLI SCHEME,

- Battery Switching Policy,
 - Special Electric Mobility Zone, and
 - Tax Reduction on EVs.
1. FAME India Faster Adoption and Manufacturing of (Hybrid &) Electric Vehicles in India: In recent years, there has been a significant increase in pollution from vehicle emissions. To reduce pollution caused by diesel and petrol-operated vehicles and to promote manufacturing of electric and hybrid vehicles, the Central Government launched the Faster Adoption and Manufacturing of (Hybrid &) Electric Vehicles in India (FAME India) 1 Scheme in 2015.
 2. Background: The National Electric Mobility Mission Plan (NEMMP) 2020 was launched in 2013 to achieve national fuel security by promoting hybrid and electric vehicles in the country. As part of the NEMMP 2020, the Ministry of Heavy Industries launched FAME India Scheme in 2015 to promote adoption of electric/hybrid vehicles (xEVs) in India.

FAME India Scheme operates in two phases. These are, •

Phase I: The first phase of Fame India Scheme started in 2015 and was functional till 31st March 2019 with a budget outlay of Rs 895 Crore. •

Phase II: The second phase of this scheme started in April 2019 and will continue till 31st March 2024.

Electric vehicles are slowly, but evidently, becoming the flavour of the season. The Narendra Modi government has set an ambitious target of converting 15 per cent of the total vehicles in the country to electric by 2024. But how many electric vehicles do we even have currently? According to the transport ministry, nearly 400,000 registered electric vehicles run in India, reported *The Times of India*.

Retail sales of electric vehicles in India have charged past the 700,000-unit mark in the first half of calendar year 2023. As of end-June 2023, as per Vahan data referenced on July 1, total sales were recorded at 721,971 units, which is already 73% of India EV Inc's record sales in CY2022. As is known, EV sales hit the million-sales milestone for the first time in CY2022 with total retails of 10,24,739 units and 210% year-on-year growth.

SWOT Analysis from the view of Indian Market

A) STRENGTH

1. **A relative abundance of exploitable renewable energy resources.** : India as geography is concern there are highly no of unused renewable power high is the most prominent strength for dream 2030, recently in Jammu Kashmir and Rajasthan the large amount of lithium was discovered which was capable Indian e-vehicle industry to export. Due to this discovery India become the largest stock holder of lithium right now.
2. **Skilled manpower and technology:** India become the first country in terms of population, also lead to provide skilled labor for production of auto vehicle. Increasing number of engineering and

technology colleges also helpful for these activity. Due to high number of labors the wage rate also comparatively low

3. **Consumer transition:** Indian customer is very diversified. He always like new things to buy either by hard cash or on loan facility. An infrastructure and consumer transition that affords opportunities to apply technologies to leapfrog stages of development.
4. **Financial Inclusion:** Today India is one of the most banking facility user countries. This is also fact that there is low saving rate in the banking sector but with number of days it is going to be increased by changing in economic development.
5. **Increasing Fuel prices:** In recent years the low production of oil and gas and high demand leads to increase in price on global level. In India the petrol and diesel price is high as compare to other countries. Also the LPG, CNG operated vehicles also get costly due to their prices hence e-vehicle is best option to chose for customer.

B) WEEKNESS

1. **Low income level:** India is featured with low income level economy. The people have hardly some money to spend on luxurious goods. Due to low saving rate it is unable to purchase a single vehicle in their life.
2. **Expensive Vehicle:** In current status Indian customer buys those cars which have low price. The highest selling car is Alto of maruti Suzuki which have price range of 3 to 4 lakh. India also known as country of NANO (Tata Motors) car, whose price is from 1 lakh to 2.50 lakh only. On the other hand the electronic vehicle has price range start from 8 lakh and above.
3. **Poor infrastructure:** An electronic vehicle needs point to point electric recharge station due to low average capacity. India already faced low production of electricity. As per some NGO data research almost 10 percent villages dose not have proper electricity channels. It's indicated that it is very important to create huge infrastructure changes before implementation of dreams
4. **Loan facility:** due to high price range it is very important to provide loan facility to the needy customer. As current scenario only govt. employee's businessman can gate loan facility over 10 lakh. It means low or middle income level people cannot get adequate loan facility.

C) OPPORTUNITY

1. **New trend and India Market:** India comes with diversify customer base. Indians like to adopt new changes. Indian market is witness of change with ne trends. So manufacturers have opportunity to change their destiny by offering low priced vehicles to the new customers.

2. **Government initiative:** The Government of India encourages foreign investment in the automobile sector and allows 100 per cent FDI under the automatic route. Under Union Budget 2019-20, government announced to provide additional income tax deduction of Rs 1.5 lakh (US\$ 2,146) on the interest paid on the loans taken to purchase EVs. The government aims to develop India as a global manufacturing centre and an R&D hub
3. **Boost for industry:** The automobile industry is supported by various factors such as availability of skilled labour at low cost, robust R&D centres and low cost steel production. The industry also provides great opportunities for investment and direct and indirect employment to skilled and unskilled labour. Indian automotive industry (including component manufacturing) is expected to reach Rs 16.16-18.18 trillion (US\$ 251.4-282.8 billion) by 2026. Two- wheelers are expected to grow 9 per cent in 2018.
4. **Employment generation:** Indian economy faced high rate of unemployment. We can achieve new level of employment rate with help of auto industry.
5. **Boost export/ foreign trade:** India already exporter of heavy vehicles (TATA, M&M), hence this is good opportunity to use this base. We have tremendous power of workforce; if we utilize optimum number of there we can boost our economy. Many countries need their vehicles. And we can be exporter of the cars and other vehicles

D) Challenges

- 1) **Climatic change:** The prospect of rapid global temperature increase has created the need for a reduction in the use of fossil fuels and the associated emissions. India has committed to cutting its GHG emissions intensity by 33% to 35% percent below 2005 levels by 2030.
- 2) **Advances in renewable energy:** Over the last decade, advances in wind and solar electricity generation technologies have drastically reduced their cost and introduced the possibility of clean, low-carbon and inexpensive grids. India proposes to add 175 GW of renewable energy capacity by 2020 and to achieve 40 percent of its electricity generation from non-fossil sources by the same year.
- 3) **Rapid urbanization:** Economic development, especially in emerging economies, is creating a wave of urbanization as rural populations move to cities in search of employment. While urbanization is an important component of the process of economic development, it also stresses upon the energy and transport infrastructure leading to congestion and pollution. According to a recent study by WHO, India is home to 14 out of 20 most polluted cities in the world. Electric vehicles (EVs) can improve that scenario by reducing local concentrations of pollutants in cities.
- 4) **Data capture and analysis:** With the rise of GPS enabled smartphones and the associated universe of mobility applications, mobility has undergone a digital revolution. That digital revolution has created possibility of a greater utilization of existing transportation assets and infrastructure. For EVs, which rely on lower variable costs to offset relatively high fixed costs, this enhanced utilization is a critical element of achieving total costs of ownership compared to internal combustion vehicles
- 5) **Battery chemistry:** Advances in battery technology have led to higher energy densities, faster charging

and reduced battery degradation from charging. Combined with the development of motors with higher rating and reliability, these improvements in battery chemistry have reduced costs and improved the performance and efficiency of electric vehicles.

- 6) Energy security:** The petrol, diesel and CNG needed to fuel an internal combustion engine (ICE) based mobility system requires an extensive costly supply chain that is prone to disruption from weather, geopolitical events and other factors. India needs to import oil to cover over 80 percent of its transport fuel. That ratio is set to grow as a rapidly urbanizing population demands greater intra-city and inter-city mobility.
- 7) Providing charging infrastructure:** The limiting factor of batteries on driving range may be addressed by developing an ecosystem of fast-charging or swapping of batteries, by creating an infrastructure, maybe even every kilometre, in dense areas. A smaller battery will lower costs by reducing the total weight of the vehicle, resulting in higher energy-efficiency and improved ability to upgrade as the technology evolves. Charging infrastructure can be rolled out on a city by city basis with select cities and regions leading the transition. This would be consistent with global experience where 33 percent of all EV sales take place in only 14 cities where charging infrastructure is widespread and convenient to use. Approaches for creating effective charging infrastructure are outlined below.
- 8) Increasing efficiency of vehicles:** Incentivizing developments to increase vehicle efficiency, thereby reducing energy consumption, can enable a vehicle to travel the same distance on a smaller battery pack. Energy efficiency can be enhanced by using more efficient electric motors [see Appendix II] using better tyres, enhancing the aero dynamics of the vehicles and reducing its weight. This would reduce battery size needed for a certain range.

CONCLUSION

As explained above though we decided to achieve dream 2030, we need to focus on all respected sectors like infrastructure, banking, marketing, electricity generation service industry. We have tremendous power of workforce; if we utilize optimum number of them we can boost our economy. India has a lot to gain by converting its ICE vehicles to EVs at the earliest. Its oil-import bill would considerably reduce. ICE vehicles are a major contributor to pollution in cities and their replacement with EVs will definitely improve air quality. There is a considerable possibility that we can become leaders in small and public electric vehicles. India has over 170 million two-wheelers. If we assume that each of these vehicles uses a little more than half a litre of petrol per day or about 200 liters per year, the total amount of petrol used by such vehicles is about 34 billion litres. At 70 per litre, this would cost about 2.4 lakh crores. Even if we assume that 50% of this is the cost of imported crude (as tax and other may be 50%), one may save 1.2 lakh crores worth of imported oil. There is a real possibility of getting this done in the next five to seven years. This would however require innovations, a policy regime that encourages access to latest technologies and a concerted effort by the Indian industry to achieve global competition through acquiring the necessary scale and using cutting edge technology.

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