ISSN–2278-5655

AMIERJ Aarhat Multidisciplinary International Education Research Journal

Volume–XIII, Issues– II March – April, 2024

OPEN ACCESS Original Research Article

ELECTRIC SHIFT: HOW TATA PIONEERED THE EV REVOLUTION IN INDIA

*Shashikant Sonawane, **Param Nimesh, ***Aditya Dusane & **** Dr. Sadhana Kapote

* Student Researcher, ** Student Researcher, *** Student Researcher & ****Research Guide, B. K. College, Kalyan (Empowered Autonomous)

Abstract

The last decade has seen a spike in carbon emissions and exacerbated global warming. This has been a driving factor for governments to switch to sustainable and green energy. It is evident that automobiles with Internal Combustion Engine (ICE) contribute majorly to these emissions increasing the carbon footprint. To counter this problem, the Governments globally are promoting the manufacturing and use of electrically powered vehicles. Tata Motors, an automobile giant, has taken this opportunity to launch its first EV in the Indian markets to become the most successful EV in India. This research explores how Tata created a new market segment in the conventional ICE automobile market in India with its first product Nexon EV and pioneered the EV revolution in India. This study helps analyze the strategies which led to the success of Tata Nexon, India's first successful EV in the personal vehicle market.

Keywords: *TATA motors, Electric Vehicles (EVs), Green energy, Carbon emissions, Global warming, Government policies.*

Introduction:

Global warming has caused serious damage to the environment. The major contributor in increased carbon emissions being fossil fuel using machinery Automobile sector is also a major contributor. There is an increased concern among the governments and masses with regards to the negative change in the environment. Governments have come up with initiatives to control pollution. Indian government plans to reach zero carbon emissions target by 2070. India being the world's 3rd largest automobile market has a substantial share in the carbon footprint. In order to curb the emissions and reach the projected Net Zero Emission target by 2070 the Indian government is promoting the use of EVs to replace traditional ICE vehicles. The government has reduced the GST on EVs. The government has proposed the exemption of registration fees for electric vehicles to promote eco-friendly vehicles in the country. The government ministry of power has allowed the sale of electricity as a charging for electric vehicles, which will motivate and attract the investor to invest in the charging infrastructure. The government has also allowed an exemption to require a permit for battery-operated transport vehicles and vehicles that run on methanol and ethanol fuels. The Ministry of Road Transport and Highways has allowed 16-18 years to obtain driving licenses to drive e-scooters.

With such increased concern among the people and introduction of government policies and initiative for reducing the negative effects of global warming many automobile manufacturers have started developing EVs (Electric Vehicles). They do not cause pollution and are environment friendly These vehicles are fueled by chargeable batteries. There are four types of electric vehicle.

1. **Battery Electric Vehicle (BEV):** This type of electric vehicle is fully powered by electricity and

ISSN–2278-5655

AMIERJ Aarhat Multidisciplinary International Education Research Journal

Volume–XIII, Issues– II March – April, 2024

OPEN ACCESS Original Research Article

this BEVs are more efficient as compared to Hybrid and plug in hybrid electric vehicle.

Electricity used to run the BEVs are stored in their large battery packs and this battery are used to power multiple EVs in this battery the power is converted by DC to AC .

Example of BEVs are TATA Nexon and TATA Tigor .

2. **Hybrid Electric Vehicle (HEV):**

This is a type of Hybrid electric vehicle which is also known as series hybrid or parallel hybrid.

In this HEVs the engine receives energy from fuel and the motor receives power from battery. The fuel tank supplies energy to the vehicle likes other regular cars. And the motor runs on the battery Both the engine and electric motor can turn the transmission at the same time.

TATA an Indian car manufacturer is the first company to introduce the EV car segment to the Indian automobile sector. It currently holds 80% EV car market share and is dominating the Indian EV market.

3. **Plug-in Hybrid Electric Vehicle (PHEV):**

This type of plug in hybrid electric vehicle are also known as series hybrid ,this PHEVs have an engine and a motor the driver can choose conventional fuel (petrol), alternate fuel (diesel) this PHEVs can Also be powered by using rechargeable battery packs this battery can also be removed and charge externally.

4. **Fuel Cell Electric Vehicle (FCEV):**

This type of fuel cell electric vehicle FCEVs are also known as zero emissions vehicle. This FCEVs uses fuel cell technology in this technology the chemical energy of fuel is converted into electric energy. The FECVs generates the electricity required to run vehicle on the vehicle itself.

TATA motors before introduction of its EVs was struggling. The revenue and market share was low. The management made new strategies which turned out to be successful and the market share and revenue generation increased. Major factor which lead to this success is cost cutting strategies made by TATA motors to reduce material wastage. It is also important to note that 7 of the TATA group subsidiaries worked together to reduce the burden and expertly completing the tasks that they specialized in which is a major contributor for the success that TATA EV segment is reaping today.

Research Methodology:

Statement Of Problem:

Considering the environmental concerns, This study aims to find consumer preferences towards EVs and EV market and tries to identify the determining factors which may be responsible in consumers transitioning from using conventionally fueled vehicles to EVs.

Objectives of the Research:

1. To understanding modern consumer perspective in the dynamic market.
2. To analyze TATA strategies to successfully introduce the EV segment in the Indian automobile sector.

Hypothesis:

H1: Tata Nexon's launch has brought a change in perception towards EVs in the Indian Market.

H2: Consumers are slowly transitioning towards EV

H3: Problems faced by consumers with EVs are primarily based on driving range and charging infrastructure.

Scope of the Study:

1. Understanding the perspectives among the car owner and non car owner demographics
2. Getting an idea about consumers transitioning towards EVs
3. Identifying problems faced by consumers.

Limitations of the Study:

1.Sample size: The Indian automobile sector has lakhs of consumer and the sample size of the research is very

ISSN–2278-5655

AMIERJ Aarhat Multidisciplinary International Education Research Journal

Volume–XIII, Issues– II March – April, 2024

OPEN ACCESS Original Research Article

less in comparison to the consumer base. This thus limits the findings to a very small demographic.

Research Method:

Type of research: Descriptive

Sample size: 50

The research is based on a survey plan. A google form was circulated among the sample for collection of primary data. The questionnaire was provided in form of MCQs in the circulated google form. People of all age categories were included in this research study in order to have diverse data collection sources.

Secondary data was collected from websites and articles providing data like sales charts of EVs in different years.

Chi-square test was used to prove the hypothesis.

Review of Literature:

'A study on adoption of Electric Vehicles in India' by Anil Khurana, V.V. Ravikumar and Manish Sidhpuria (2019) talks about the different factors that affect a consumer's adoption of an EV. The respondants of the research conducted were car owners. Research included elements like Perceived Economic Benefit (PEB), Environmental Concern (EC), Social Influence (Soc .In), Self image (IM) , Attitude (ATT), Behavioral Intention (BI). According to the findings Attitude (ATT) is the main factor. Perceived Economic Benefit (PEB) is also another major contributing factor. They further suggest the stakeholders to work together and there should be incentives upon using EVs to increase adoption.

'Study on Electric Vehicles in India Opportunity and Challenges' by Menna Mohamed, Tamil Arasan, G Sivakumar(2018) mentions opportunities and challenges for the EVs in India. According to them cost, efficiency, managing demands, battery related management functions, global energy demand and land availability are the challenges faced by the EV sector. They suggest The government to find suitable ways to tackle challenges to fulfill their plans.

'The Study of Electric Vehicles in India' by Sonali Subhash Parab (2022) focuses on the aspects that can influence EV adoption. According to the research findings she suggests that all the stakeholders should work together for promotion of EV adoption. Advertising the benefits of EV will enhance the acceptance. Marketers must highlight the features like battery charge, battery life, maximum speed. It is also suggested to make the customers aware of the positive impact of EVs in the environment. EV owners should also be made aware about the incentives available for them.

'Electric Vehicles and India recent trends in Automobile Sector' by Karan Mahal and Priyadarshini Patil (2021) studies the expectation of the consumers concerning EV and Hybrid vehicles potential. It also aims to create awareness regarding RETROFITTING, which is the process of converting a combustion engine vehicle into an EV. According to the authors it has a potential to create huge opportunities in future. It also highlights the challenges like non attractive pricing, pricing problems faced by manufactures in order to cut costs and boost infrastructure.

'Factors influencing Customer Preference and Adoption of Electric Vehicles in India: A journey towards more Sustainable Transportation' by Udit Chawla, Rajesh Mohnot, Varsha Mishra, Harsh Vikram Singh and Ayush Kumar Singh found that when more developed charging infrastructure is available, people are more likely to buy plug-in electric cars, it increases demand for plug-in cars by 50%. Different policies and cultural factors may also influence adoption rate of EVs. The study also found that living in a multi-car family reduced a person's interest in EVs.

Data Interpretation:

The table below gives an overview of sales record of EV manufacturers in the year 2023.

ISSN–2278-5655

AMIERJ Aarhat Multidisciplinary International Education Research Journal

Volume–XIII, Issues– II March – April, 2024

OPEN ACCESS Original Research Article

Table 4.1

EV manufacturers sales chart year 2023

Manufacturers	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Tata Motors	2,471	3,917	7,303	4,492	6,002	5,479	5,461	4,771	4,312	5,538	5,024	4,806	59,580
MG Motor India	435	362	517	350	464	1,158	1,237	1,202	891	929	935	950	9,430
Mahindra	0	7	259	537	389	412	380	405	359	273	518	662	4,201
BYD	140	242	300	164	146	184	118	104	151	141	139	168	1,997
Citroen	0	0	209	240	324	336	223	118	141	172	126	49	1,938
Hyundai	117	50	48	54	170	160	116	186	213	195	165	123	1,597
Kia	48	30	23	38	47	39	29	28	35	52	37	30	436

The above table shows the sales chart of the EV manufacturers in the year 2023. It is very evident that Tata motors has a huge presence in the EV sector. They have sold a total of 59,58o units in comparison the second highest seller is MG Motor India with only 9430 unit sales. A very tremendous difference between the market leader and the competition is highlighted through this table. It shows how Tata motors are dominating the EV sector.

Table 4.2

Fiscal Year	PVs sold	EVs sold	EV share of PVs
2021	2,24,109	4,218	1.88%
2022	3,73,138	19,106	5.12%
2023	5,44,391	47,792	8.77%
2024(Apr-Aug 23')	2,34,072	31,911	13.63%
Total	13,75,710	1,03,027	7.48%

The above given table showcases the Tata Motors EV share of PVs from the fiscal year 2021 to 2024 (Apr-Aug 23'). Along the years the EV share among the PVs has increased. In the year 2021 it was only 1.88% but by the fiscal year 2024 (Apr-Aug 23') the EV share among PVs increased upto 13.63%.

This data thus clearly indicates the increasing market share EVs are experiencing. It indicates the increasing demand trend for EVs in the PV sector. There is certainly huge potential for the EV market.

Primary Data Analysis:

1. **Change in Perception after Nexon EV's launch:**

   Analysis of data from the customer survey shows that customers have a significant change in perception towards EVs after the Launch of Tata Nexon EV.

ISSN–2278-5655

AMIERJ Aarhat Multidisciplinary International Education Research Journal

Volume–XIII, Issues– II March – April, 2024

OPEN ACCESS Original Research Article

Table 4.3

Age Group/ Change in Perception	18-24	25-30	31-40	40+
Yes	19	1	5	9
No	9	2	1	2

Image 4.1

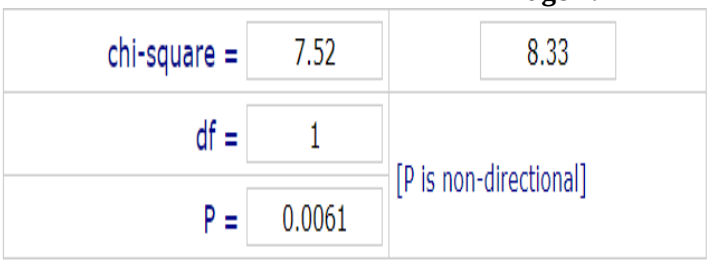


Table 1 shows the data collected from the consumer survey from 50 participants. The table depicts change in perception towards EVs after the launch of Tata's Nexon EV. The analysis of this data shows significant positive shift of consumers perception towards EVs in the Indian market after the launch of Tata Nexon. Furthermore, The Chi-Square test results in Image 1 prove that we can **accept the H1 Hypothesis: Tata Nexon's launch has brought a change in perception towards EVs in the Indian Market.**

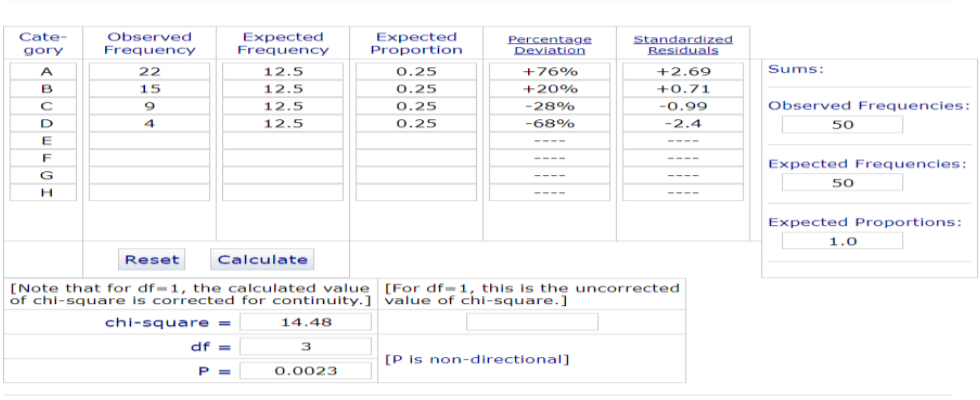
2. Problems limiting customers from purchasing EVs in India:

Consumer survey sheds light on the various problems and helps identifying the most significant problems limiting the customers to opt for purchasing EVs in India.

Table 4.4

Problems	Responses	Rank
Charging infrastructure	22	1
Range	15	2
Service	9	3
Availability	4	4

Image 4.2



ISSN–2278-5655

AMIERJ Aarhat Multidisciplinary International Education Research Journal

Volume–XIII, Issues– II March – April, 2024

OPEN ACCESS Original Research Article

Table 2 shows the data collected from the consumer survey from 50 participants. The table depicts the problems with EVs faced by consumers from different age groups. The analysis of this data shows that Charging Infrastructure in India is the biggest factor deterring people from Purchasing EVs in India followed by Driving Range limitations. The Chi-Square test results in Image 2 prove that we can **accept the H1 Hypothesis: Problems faced by consumers with EVs are primarily based on driving range and charging infrastructure.**

3. Positive perception about EVs in the Indian Market

Data from the customer survey reveals that there is a highly positive perception about EVs in the Indian Markets.

Table 4.5

Positive	Neutral	Negative	Total
37	10	3	50

Image 3

chi-square =	38.6	
df =	2	[P is non-directional]
P =	<.0001	

Table 3 shows the data collected from the consumer survey from 50 participants. The table depicts consumer's perception towards EVs from different age groups. The analysis of this data shows that There is a significantly positive perception towards EVs in India across all age groups. **T**he Chi-Square test results in Image 3 prove that we can **accept the H1 Hypothesis: There is a positive perception about EVs in the Indian Market and people are shifting towards EVs.**

Summary of Findings:

Considering the environmental concerns, this study aims to find consumer preferences towards EVs and EV market and tries to identify the determining factors which may be responsible in consumers transitioning from using conventionally fueled vehicles to EVs.

The questionnaire was circulated amongst 50 car and non car owners combined with the aim of collecting data regarding their perceptions towards EVs and EV market and trying to identify factors they find are important which may lead to them transitioning from using conventionally fueled cars to using EVs.

Table 4.1 is a secondary data table which displays the market sales of EV units sold by manufacturers. Tata motors have clearly dominated the EV segment with a huge difference in comparison to its competitors.

Table 4.2 is also secondary data table which shows the market share percentage of EVs in PV sector. It displays an increasing trend in percentage of market share of EVs in PV sector thus indicating the potential and growth EV sector will hold in future.

Table 4.3 is focused at identifying if there was a change among the sample's perception about EVs after the launch of Nexon EV. 36 among the sample had a change in perception towards EVs after Nexon EV's launch, whereas 14 among the sample had no change of perception after Nexon EV's launch. P value for the test is 0.0061 proving that the hypothesis is acceptable

ISSN–2278-5655

AMIERJ Aarhat Multidisciplinary International Education Research Journal

Volume–XIII, Issues– II March – April, 2024

OPEN ACCESS Original Research Article

and that Nexon EV's launch did bring a perception shift among majority of the sample.

Table 4.4 helps in identifying factors which limit consumers from opting for purchase of EVs. Charging infrastructure was seen as the biggest problem with 22 responses, Range was seen as the second biggest problem with 15 responses. Service was 3rd in the findings with 9 responses and Availability was the last factor on the table with 4 responses.

P value for the test was 0.0023 making the hypothesis of problem faced by consumers with EVs are primarily based on driving range and charging infrastructure a valid hypothesis.

Table 4.5 revealed that there is a highly positive perception about EVs in the Indian Markets.P value for the test was <.0001 making the hypothesis that there is a positive perception about EVs in the Indian Market and the people are shifting towards EVs a valid hypothesis.

Suggestions:

Continuously monitor and stay updated on the latest developments in the Indian EV market, government policies, and consumer trends. The EV landscape is rapidly evolving.

Engage with industry experts, government agencies, and EV manufacturers to gain insights and access to potential respondents. Collaborations can enhance the quality of your research.

Company can create awareness about harmful effect of gases emitted through vehicles to consumer and tell them benefit of using an electric vehicle.

The EV industries should improve their product line with improved range, fast charging technology and performance. This can be only done by proper research and development.

Since the EV sector is in its initial stages, Manufacturers must price their products attractively.

Consumers need to be informed about the incentives they will receive for using EVs.

Conclusion:

With the rising concerns over climate change and efforts to curb emissions and carbon footprints, EVs are the way to achieve sustainable and environmentally friendly alternatives to Internal Combustion Engine vehicles. This research helps understand the consumers perception towards EVs in India and evaluate the Impact Tata motors created with their first EV in the Indian Markets the Nexon EV.

This research analyzed consumer perceptions and the findings proved that consumers are willing to switch to EVs in the Indian market. The finding has also shed light on tata Nexons Impact with a significant majority of the participants having a change in perception about EVs after the launch of the Nexon EV.

Table 4.2 displays the increasing trend in the Market share in the EV Sector of India. The growth of the EV market in India has been pioneered by Tata as the Nexon EV holds 72% of the market share in the Indian EV Market. The analysis of secondary data regarding the Market Share and sales growth in India coupled with a positive consumer perception and perception shift post the launch of Nexon EV clearly help us conclude that Tata has pioneered the EV revolution in India.

This research helps understand the dynamic Indian EV market with data analysis of market shares and sales of EVs in Indian EV market followed by analysis of consumer survey targeted to understand the problems deterring consumers to opt for purchasing an EV in India.

The findings in table 4.4 show that charging Infrastructure and driving range limitations are the top reasons for consumers to not opt for purchasing an EV. To ensure the growth of EV industry in India, these limitations must be worked on and improved to meet the needs of the Indian consumer.

EVs in India are nothing short of excellent innovations and Tata has understood the Indian Market and Indian

ISSN–2278-5655

AMIERJ Aarhat Multidisciplinary International Education Research Journal

Volume–XIII, Issues– II March – April, 2024

OPEN ACCESS Original Research Article

consumer in great detail. The frugal engineering and the economical pricing of the Tata Nexon has helped it succeed in the Indian Market as the most successful EV.

With this trend towards sustainability in place, other automobile manufacturers are slowly moving towards an electric shift with new EVs. Being launched every year in the Indian markets.

With the government initiatives and manufacturers innovations and consumers willing to shift towards sustainable ways of commute, EVs are the future of Sustainable and Net Zero Emissions India.

References:

Mohamed, Menna & Arasan, Tamil & Sivakumar, G. (2018). Study on Electric Vehicles in India Opportunities and Challenges. International Journal of Scientific Research in Environmental Science and Toxicology. 3. 1-5. 10.15226/2572-3162/3/1/00115.

Khurana, A., Kumar, V. V. R., & Sidhpuria, M. (2020). A Study on the Adoption of Electric Vehicles in India: The Mediating Role of Attitude. Vision, 24(1), 23-34.

Sonali Subhash Parab The study of electric vehicle In India 'International Research Journal of Modernization in Engineering Technology and Science 2022 Volume:04/Issue:05 ISSN: 2582-5208

Karan Mahal,Priyadarshini Patil (2021),'Electric Vehicles and India Recent Trends in the Automobile Sector',International Journal of Research Publication and Reviews, , Issue (7),Vol (2),ISSN 2582-7421,Pg 661-668

Chawla U, Mohnot R, Mishra V, Singh HV, Singh AK. Factors Influencing Customer Preference and Adoption of Electric Vehicles in India: A Journey towards More Sustainable Transportation. Sustainability. 2023; 15(8):7020

(2024, Jan 04), 'Tata dominates EV sales with 73 percent market share in 2023', www.autocarindia.com, https://www.autocarindia.com/industry/tata-dominates-ev-sales-with-73-percent-market-share-in-2023-430226

Cite This Article:

Sonawane S., Param N., Dusane A., & Dr. Kapote S. (2024). *Electric Shift: How Tata Pioneered the EV Revolution in India. In Aarhat Multidisciplinary International Education Research Journal: Vol. XIII (Number II, pp. 17–24).* **AMIERJ.** ***https://doi.org/10.5281/zenodo.10926542***