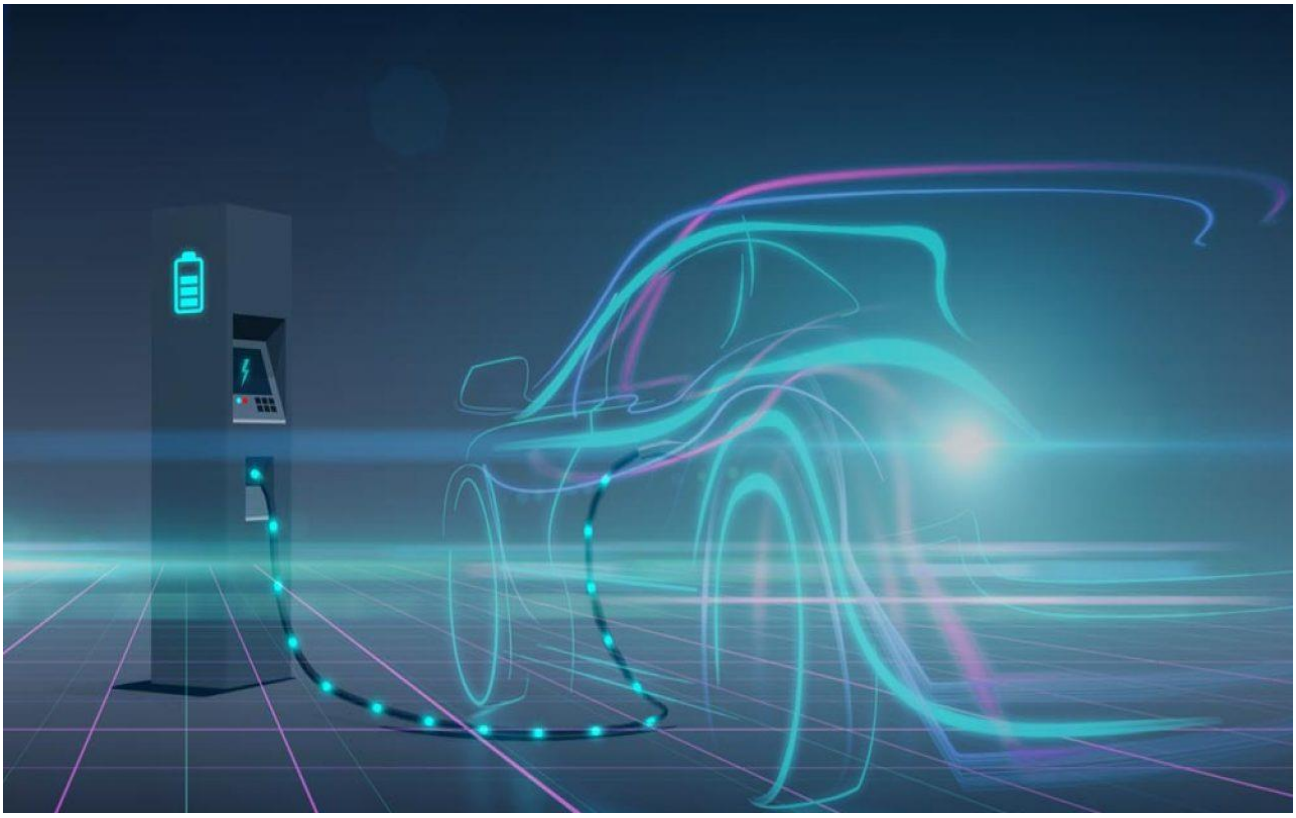
MARKET SEGMENTATION ANALYSIS

OF ELECTRIC VEHICLE MARKET IN INDIA



OVERVIEW

Over 90% of vehicles worldwide rely on oil, leading to a growing trend towards alternative energy sources. Electric vehicles (EVs) are gaining popularity as a potential replacement for current-generation vehicles. In India, the market share of EVs is around 0.1%, and the country imports 70% of its oil. As global air pollution increases, EVs can contribute to sustainable development goals and address the growing gap between domestic crude oil production and consumption.

The recent scenario of the road transportation sector can be highlighted as:

- Energy consumption : 524 million tons of oil equivalent
- Vehicle to people ratio : 1:56.3
- Per capita energy : 442 kg of oil equivalent
- GHG emissions : 1730 million tons of CO_2 equivalent
- Electric Vehicles sold : 25000 (all) and 2000 (cars)

In contrast to other nations, there are a lot more cars per person, but there are also a lot more people and emissions. With 1.726 billion metric tons of CO_2 emissions, India comes in third place. Therefore, it is imperative that attention be paid to EV technology, which can achieve zero emissions for environmentally friendly transportation.

In addition, a sharp rise in the number of personal automobiles has been seen as a result of urbanization and the decentralization of municipal regions.

EV (Electric Vehicle) /HEV (Hybrid Electric Vehicle) /PHEV (Plug-in Hybrid Electric Vehicle) can be more beneficial for Indian roads due to the following reasons:

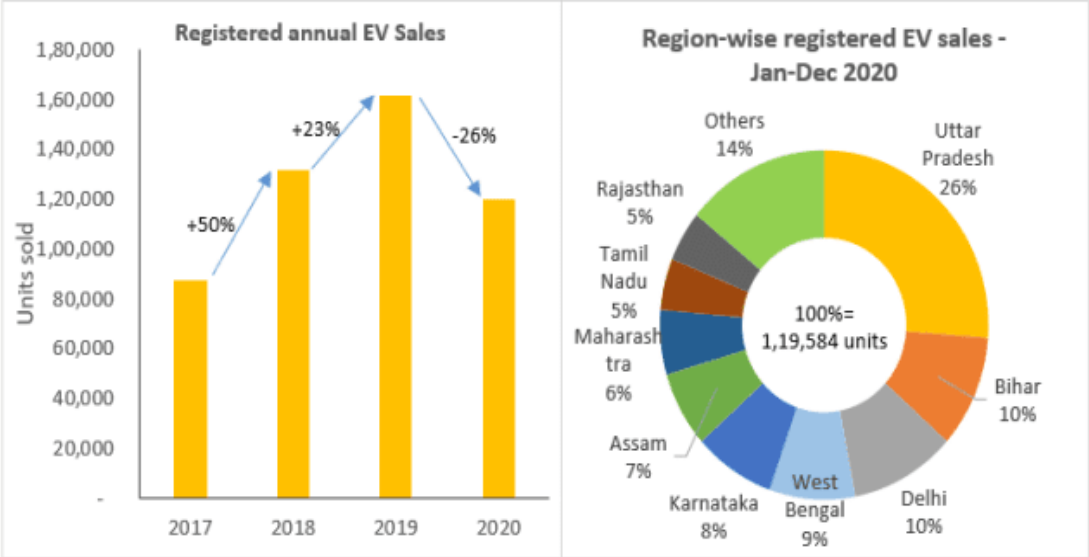
1. Operate at higher efficiency at low Indian driving speeds than Internal Combustion Engines.
2. Recover a higher share of energy per Indian trip in braking.
3. Use no fuel during idling, with higher idling time in traffic in India.
4. Average range travelled in India is smaller than in the U.S. & Europe, making EVs more feasible.
5. Urban driving cycle patterns provide high efficiency for electric vehicles.

MARKET REVIEW

By Type of Vehicle and Power Source, the Indian Electric Vehicle Market is Divided.

- Segmenting the market based on vehicle type, there are three categories: passenger cars, commercial vehicles, and two- and three-wheelers.
- The market is divided into three categories based on the type of power source: battery, plug-in, and hybrid electric vehicles.

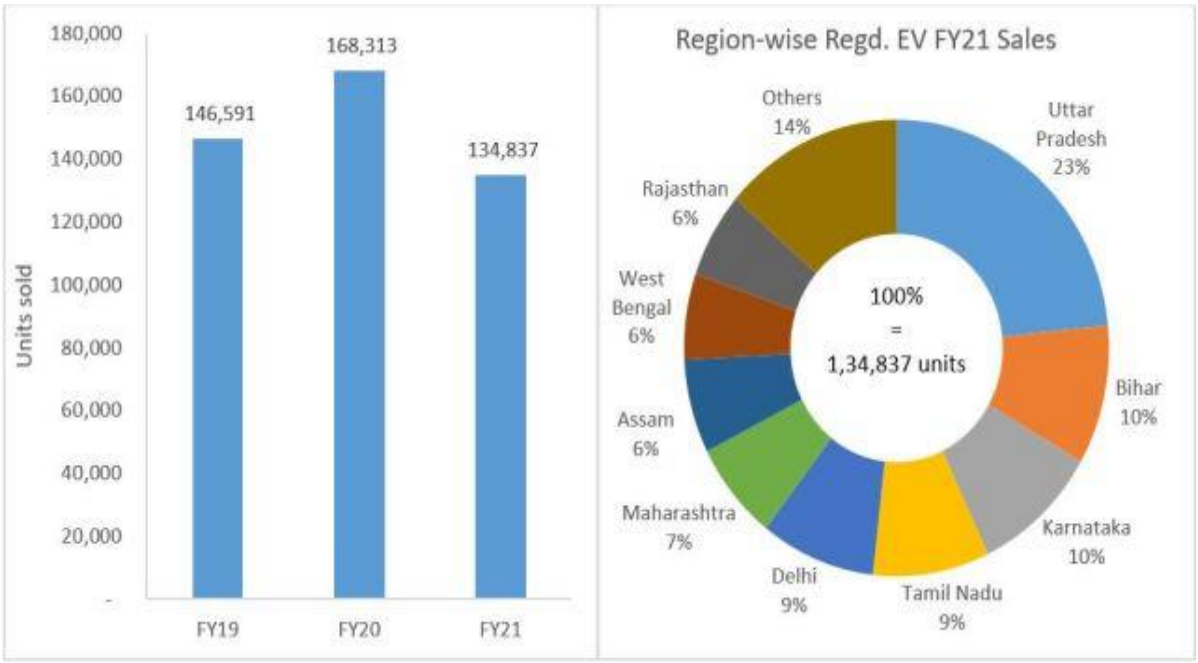
The report focuses on the Indian electric vehicle market, which was estimated to be worth USD 5 billion in 2020 and is projected to increase at a rate of 44% by 2026. The market is affected by the COVID-19 pandemic, but despite supply chain interruptions, growth is anticipated to accelerate as a result of government actions and legislation.



To lower emissions and its carbon footprint, India is putting e-mobility ideas into practice. As state governments promote the use of electric vehicles, e-commerce giants such as Amazon are introducing last-mile delivery services. Kerala plans to deploy 6,000 ebuses by 2025 and one million electric vehicles by 2022. With 100% foreign direct investment, the unexplored electric two-wheeler market in India is anticipated to grow faster than the current market thanks to the FAME India initiative.

MARKET DYNAMICS

Around 144 thousand two-wheelers were sold in India during the 2020–21 fiscal year, making them the most popular type of electric vehicle. Compared to the 152,000 units sold the year before, this was a 5% drop. Only the four-wheelers segment experienced growth.



Owing to affordable and easily accessible labor, the Indian EV industry has consolidated with the presence of significant companies. To obtain an advantage over rivals, well-established market companies are, however, releasing new models. Through investor funding and reaching out to previously undiscovered cities, the start-ups are growing their footprint. To make their imprint in the market, companies are throwing a lot of money into R&D and introducing new models.

GOVERNMENT INITIATIVES AND POLICIES SUPPORTING

THE EV INDUSTRY

The Indian government has announced its National Electric Mobility Mission Plan (NEMMP) to boost the EV market. The plan aims to make electric vehicles economically viable and self-sustaining by 2020. The government has invested over INR 13,000 crore in demand incentives, INR 1,800 crore in R&D, INR 5,000 crore in power infrastructure, and INR 1,200 crore in charging infrastructure. The plan also involves collaboration between the government and industry to promote indigenous manufacturing capabilities, consumer awareness, technology, and infrastructure.

MARKET CHALLENGES

India's rapid push for electric vehicles (EVs) is hindered by factors like limited options, driving range, affordability, and lack of charging infrastructure, despite the hype surrounding the technology.

Due to the fact that a sizable amount of India's car sales are not EV-accessible, affordability concerns impede the country's price-sensitive market.

Unlike affluent nations with readily available charging stations, India's fledgling electric vehicle sector lacks the necessary infrastructure for charging. The creation of a charging infrastructure is essential to the growth of an appropriate environment and EV sales. Not many choices go beyond 150 km/charge.

COMPETITIVE LANDSCAPE

• Established firms are introducing new models to acquire a competitive edge & Major players dominate the market since they can afford to hire inexpensive labor.

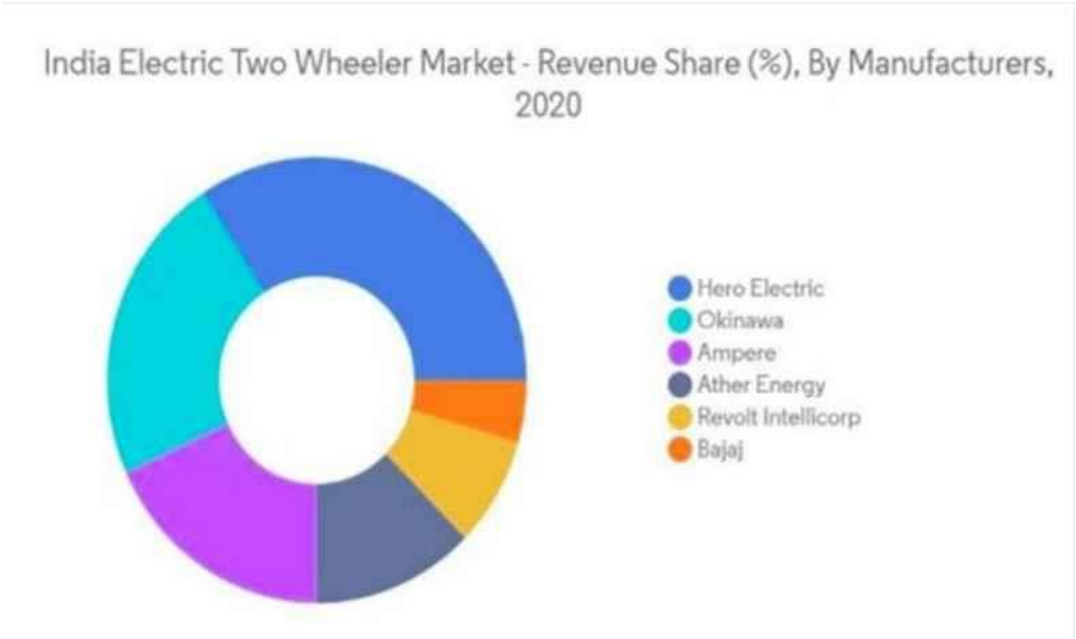
• Future electric vehicles will be powered by Tata Motors' efficient permanent magnet AC motor, the ZIPTRON.

• With a 340 km operating range, Morris Garages Motor India introduced its first electric internet SUV in January 2020.

• Businesses are growing by obtaining capital and relocating to new areas. To gain traction in the market, businesses make significant R&D investments and introduce novel models.

OPTIMISTIC GROWTH FOR ELECTRIC BUSES AND TWOWHEELER VEHICLES

State governments in India are actively encouraging the electrification of buses, acquiring electric vehicles from both domestic and Chinese producers. The nation's transportation problems, the government's strict regulations to reduce vehicle emissions, and the availability of affordable electric two-wheeler models as an alternative to traditional fuel-based vehicles are the main factors driving the growing demand for electric buses. The Indian market for electric vehicles is seeing demand driven by these factors.



ASSUMPTIONS

- In India, there are 30 crore registered automobiles, comprising 22 crore two-wheelers and 8 crore four-wheelers.
- For two-wheelers, the average annual growth is 75%, and for four-wheelers, it is 25%.
- Six lakh electric cars were on the road in 2020, of which 5.4 lakh were two-wheelers and 0.6 lakh were four-wheelers.
- The only ecological alternative to petrol and diesel cars is an electric vehicle (EV).

From the above analysis of the Indian automobile industry, we can see that there is a lot of potential to grow, as the market has just started picking up the pace.

SITUATIONAL ANALYSIS

A situation analysis is necessary before marketing strategic plan development due to increasing EV adoption across market segments, government incentives, subsidies, and low fuel costs.

• **Customer Usage:** Daily routines and average daily run determine EV adoption.

• **Mileage:** Indian customers seek higher range and less charge, compromising speed.

• **Safety:** EVs must match gasoline quality due to battery fire incidents.

• **Quality:** Comfort, build quality, and additional features attract new customers.

DATA SOURCES

Data was scraped from multiple websites using Selenium, such as bikewale and carwale, and user reviews were collected in which they shared their experiences with the available EV products on the market.

We have considered below datasets for the analysis.

1. EVStats.csv : This data source has the information about each state in India and sales about the Electric vehicles line two wheelers and three wheelers. It gives total sales in each state.

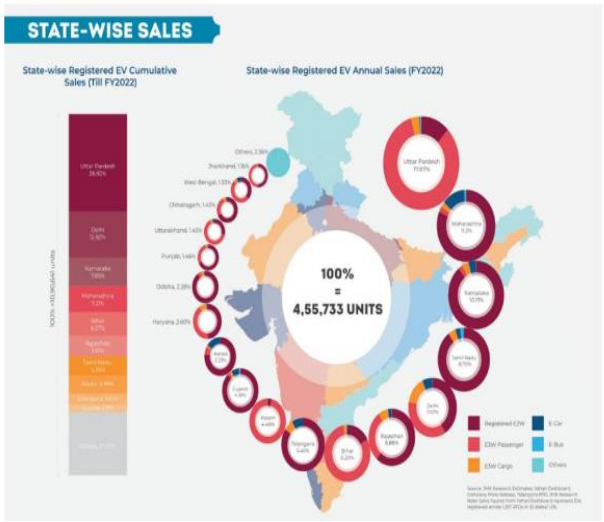
	SL No	State	Two Wheelers (Category L1 & L2 as per Central Motor Vehicles Rules	Two Wheelers (Category L2 (CMVR))	Two Wheelers (Max power not exceeding 250 Watts)	Three Wheelers (Category L5 slow speed as per CMVR)	Three Wheelers (Category L5 as per CMVR)	Passenger Cars (Category M1 as per CMVR)	Buses	Total in state
0	1	Meghalaya	0	0	0	0	0	6	0	6
1	2	Nagaland	0	20	3	0	0	1	0	24
2	3	Manipur	16	8	11	0	5	12	0	52
3	4	Tripura	28	9	36	0	0	8	0	81
4	5	Andaman & Nicobar islands	0	0	0	0	0	82	0	82

2. Indian car purchase behaviour research 1.0.csv: Indian consumers' purchasing habits for cars are included in this dataset. We can anticipate consumer demand and introduce new products that will satisfy consumers by tracking various brands and their sales trends.

	Brand	Model	AccelSec	TopSpeed_KmH	Range_Km	Efficiency_WhKm	FastCharge_KmH	RapidCharge	PowerTrain	PlugType	BodyStyle	Segment	Seats	PriceEuro
0	Tesla	Model 3 Long Range Dual Motor	4.6	233	450	161	940	Yes	AWD	Type 2 CCS	Sedan	D	5	55480
1	Volkswagen	ID.3 Pure	10.0	160	270	167	250	Yes	RWD	Type 2 CCS	Hatchback	C	5	30000
2	Polestar	2	4.7	210	400	181	620	Yes	AWD	Type 2 CCS	Liftback	D	5	56440
3	BMW	iX3	6.8	180	360	206	560	Yes	RWD	Type 2 CCS	SUV	D	5	68040
4	Honda	e	9.5	145	170	168	190	Yes	RWD	Type 2 CCS	Hatchback	B	4	32997

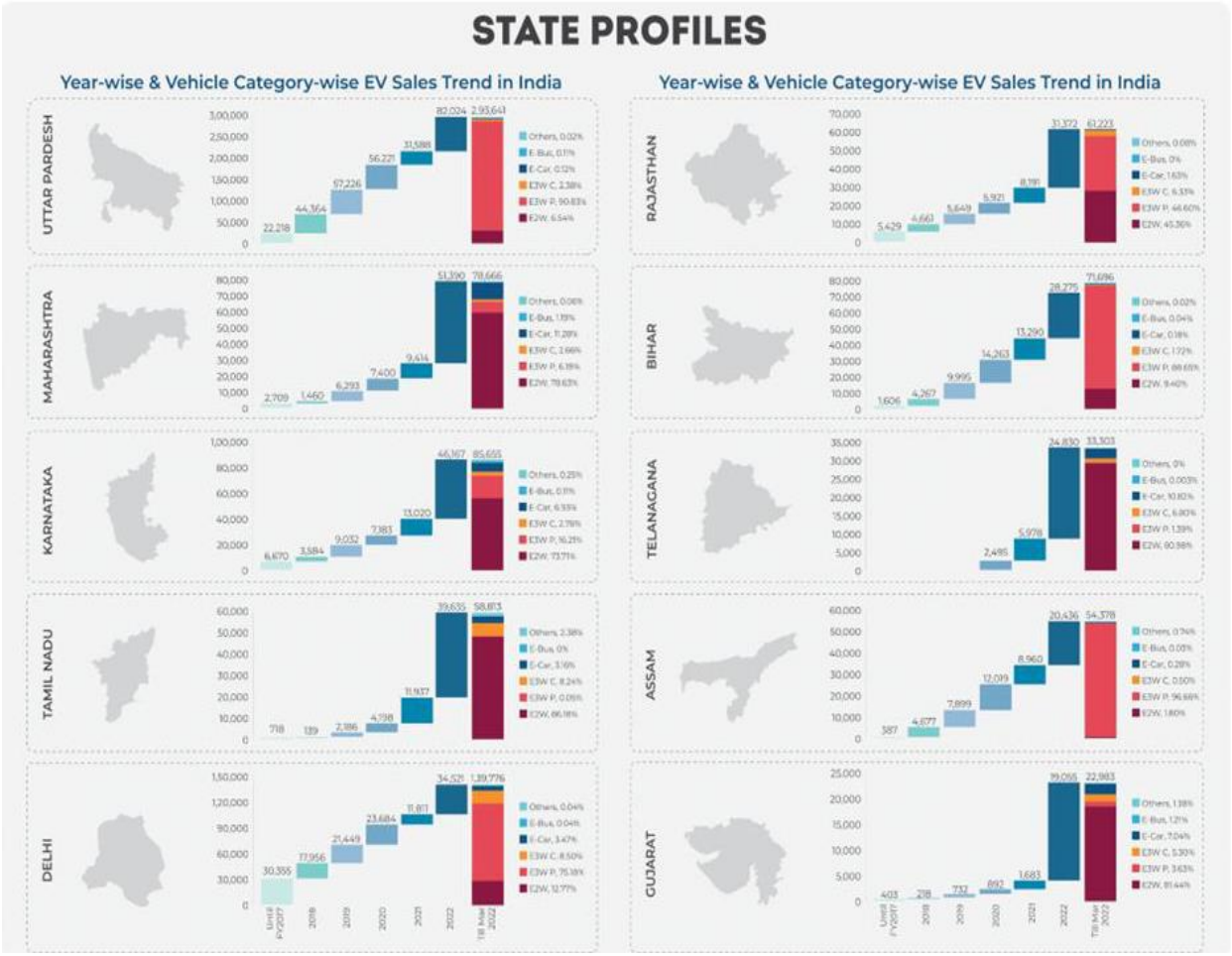
GEOGRAPHIC ANALYSIS

[2021]



[FY-2022]

According to the data above, UP is the region with the highest number of EV sales overall.



However, by thoroughly examining the top states for EV sales, we can draw some significant conclusions from the data at hand.

UP Leads in EV Sales

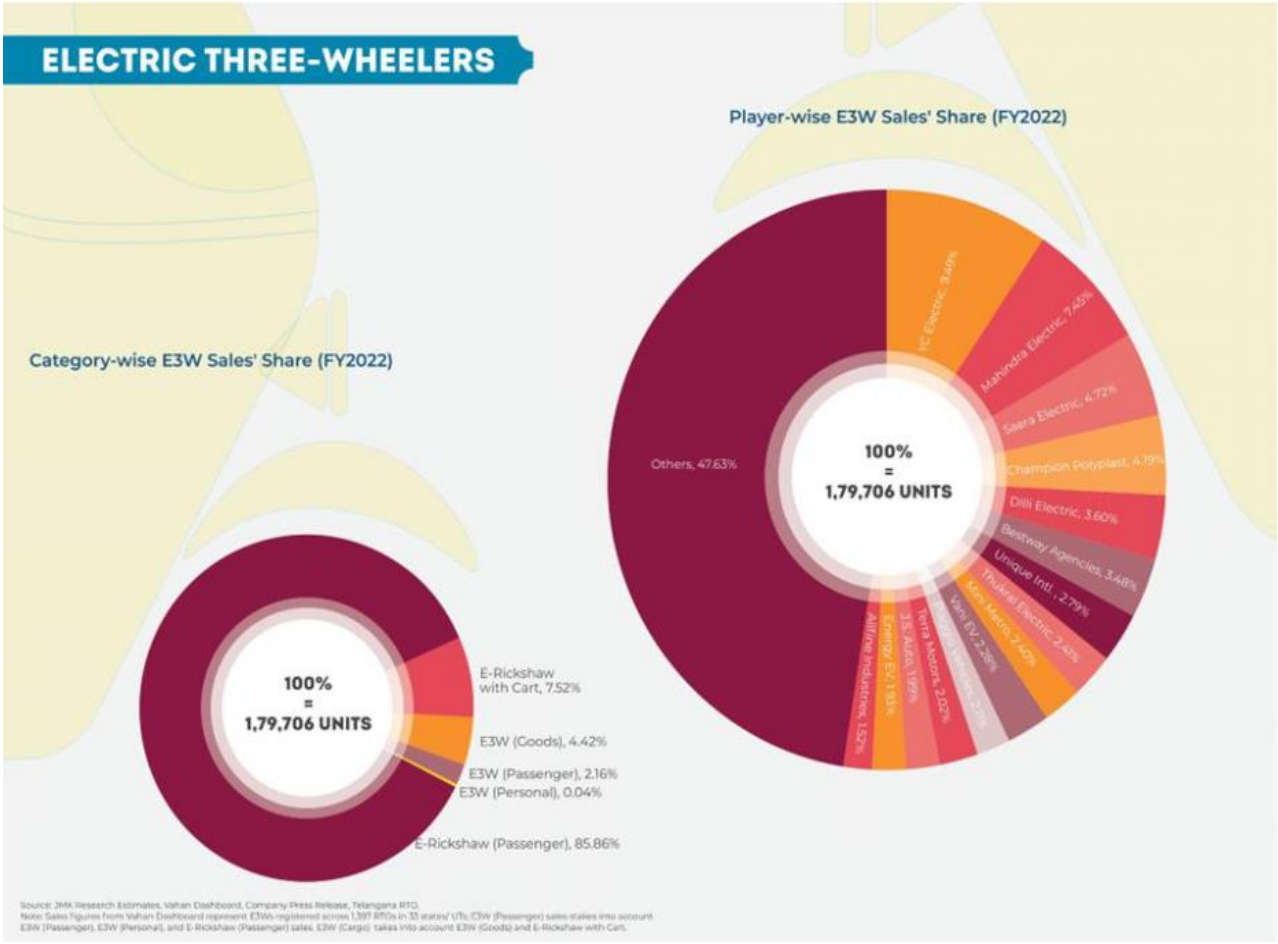
• Majority of sales in 3-wheeler segment for transport.

• Tamil Nadu has the highest two-wheeler EV sales at 86%.

• Maharashtra has the highest four-wheeler EV sales at 11%.

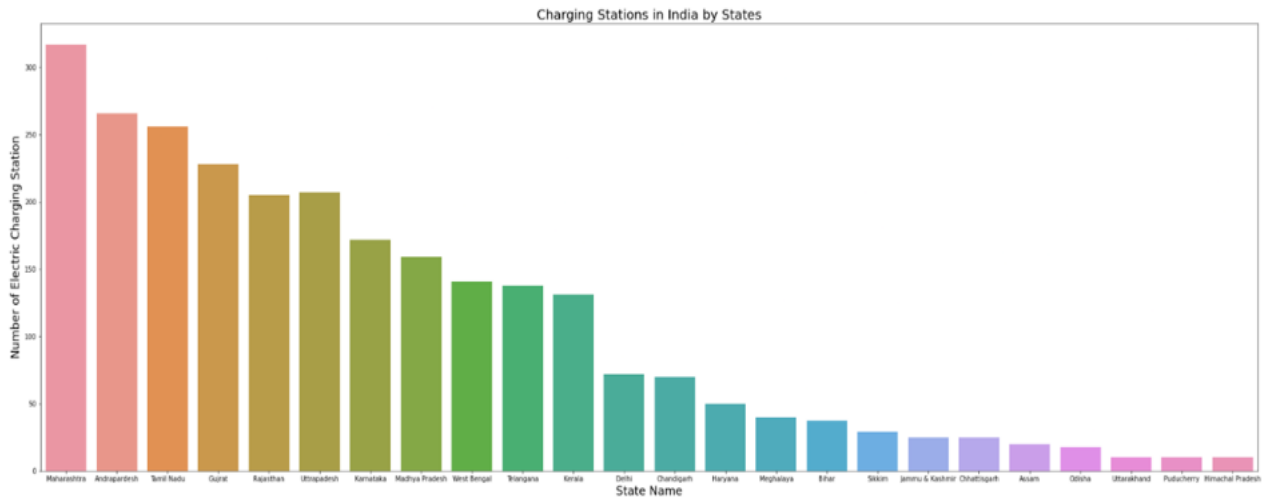
• Sales vary across other segments.

Since E3W and E2W account for the majority of EV sales, firms can choose which market to target for maximum initial sales and rapid development.



The sales breakdown for E2Ws and E3Ws for FY-2022 is displayed in the above graph.

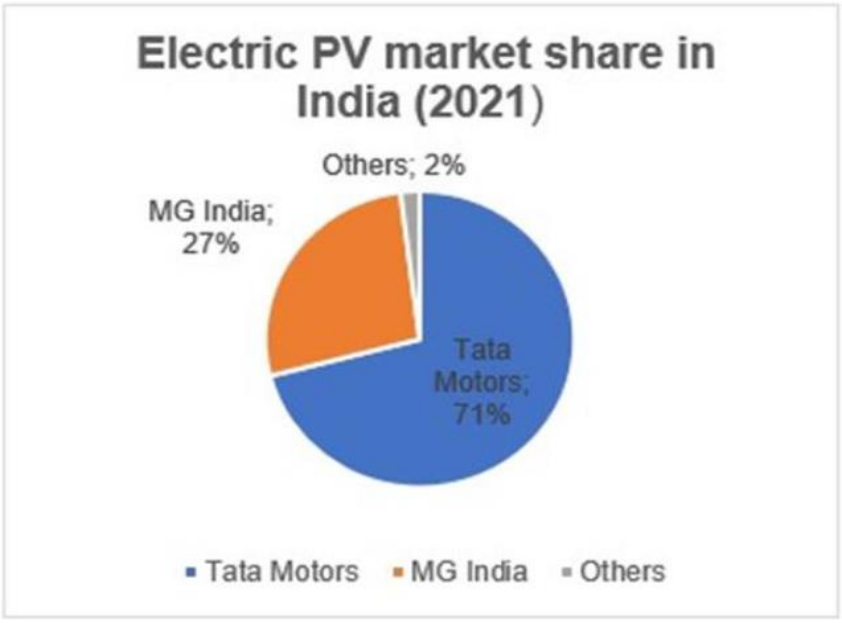
Geographical analysis also heavily relies on EV charging facilities, since range anxiety is a big worry for EV customers.



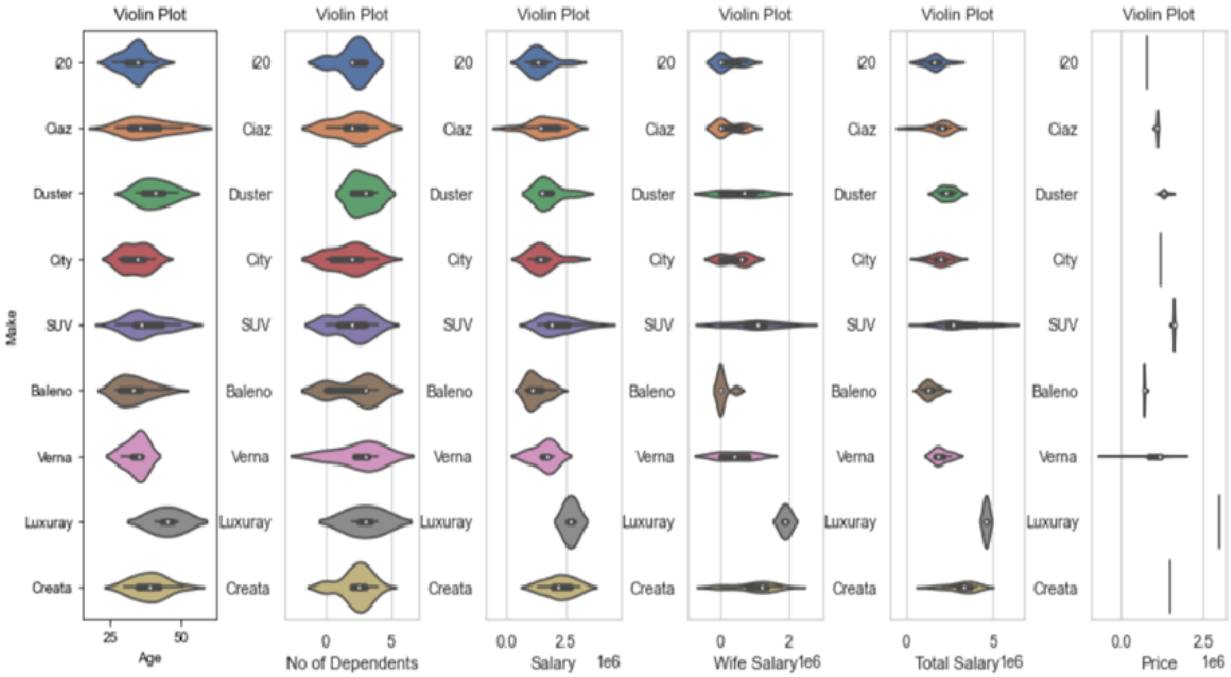
The top five states with the most charging stations are Rajasthan, Gujarat, Tamil Nadu, Maharashtra, and Andhra Pradesh.

DEMOGRAPHIC ANALYSIS

Tata Motors dominates the electric vehicle market with 71% market share, featuring flagship Nexon and Tigor EV models. MG Motors India offers the longest electric vehicle lineup, with more models expected to launch.



We will visualize the dataset to gain knowledge on customer preferences.



Observations :

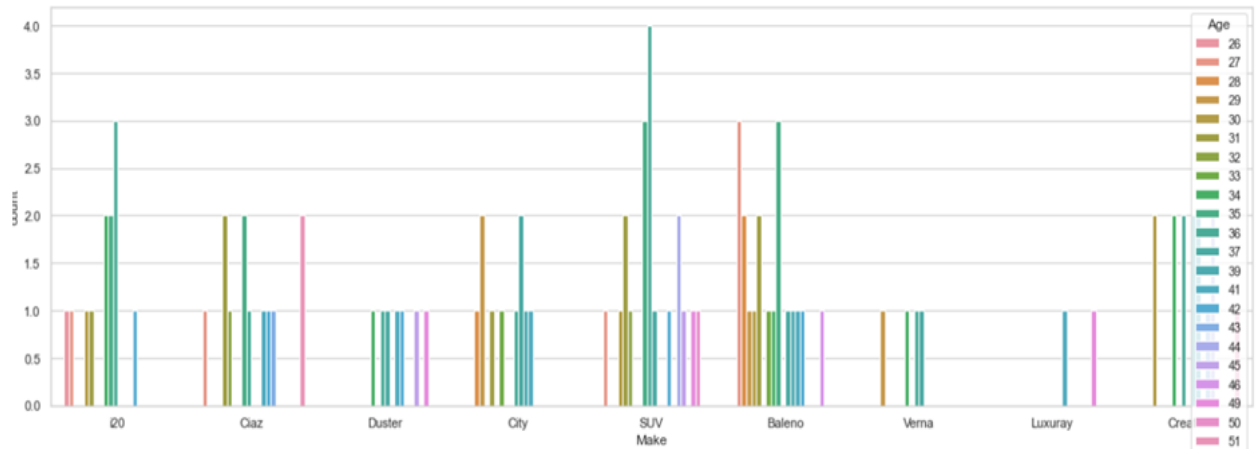
Consumer Car Choices

• Age: Younger consumers prefer cheaper cars.

• Number of Dependents: More dependents lead to SUV preference.

• Salary: Average salary chart correlates with car price.

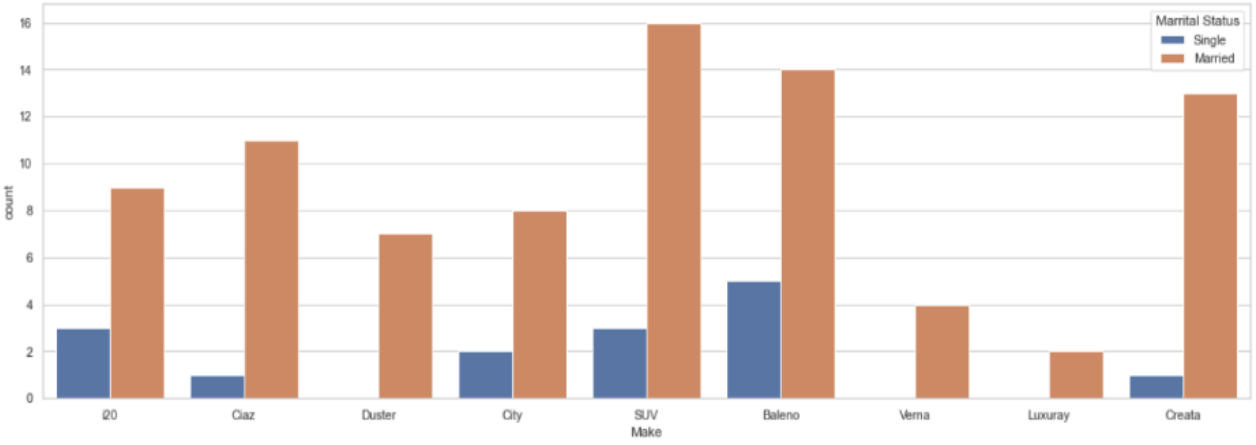
Plot for Relationship between consumers age and the vehicles they purchase .



Observation :

The age group of thirty to forty, as well as the late twenty-first century, is the most likely to purchase an electric vehicle.

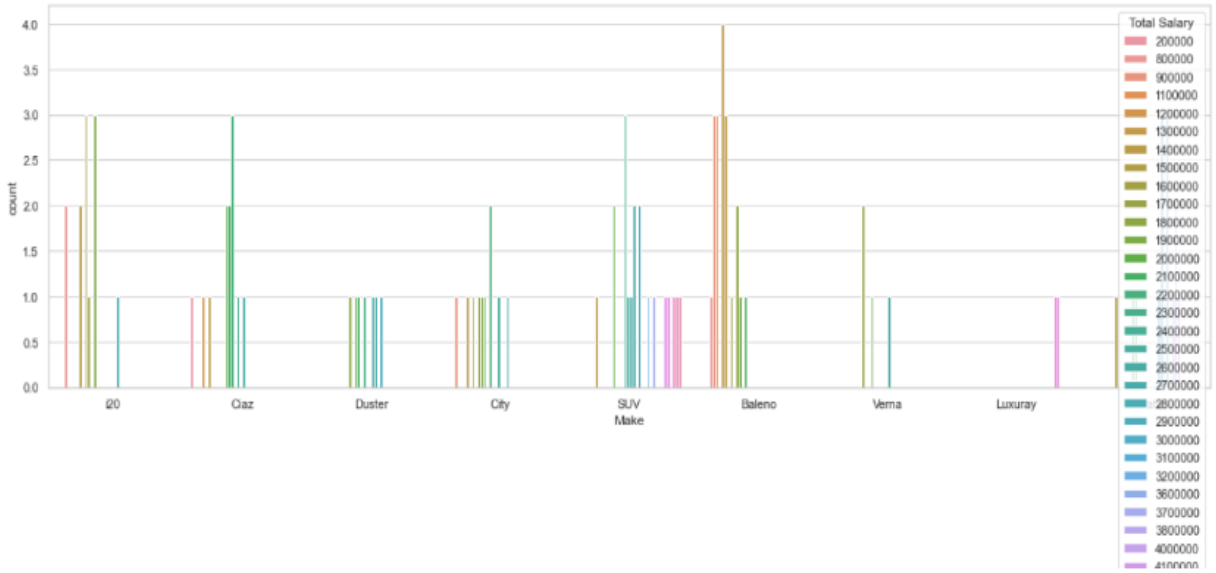
Make a plot for The association between the marital status of customers and the cars they buy.



Observation :

It is evident from the plot above that married individuals are more likely than single individuals to buy electric vehicles.

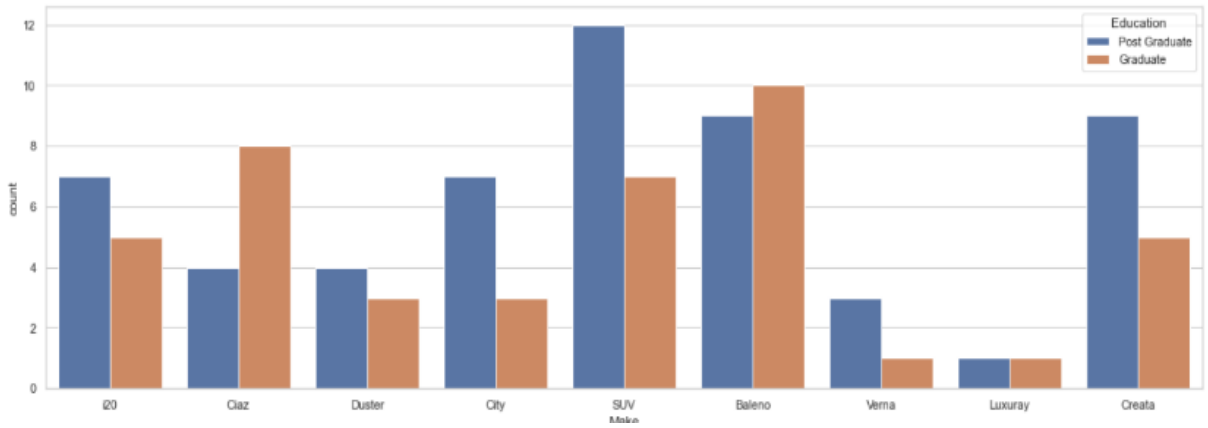
Plot the relationship between the overall salary of the customer and the cars they buy.



Observation :

We can infer from the above plot that an individual's wage is directly correlated with the kind of electric vehicle they typically purchase.

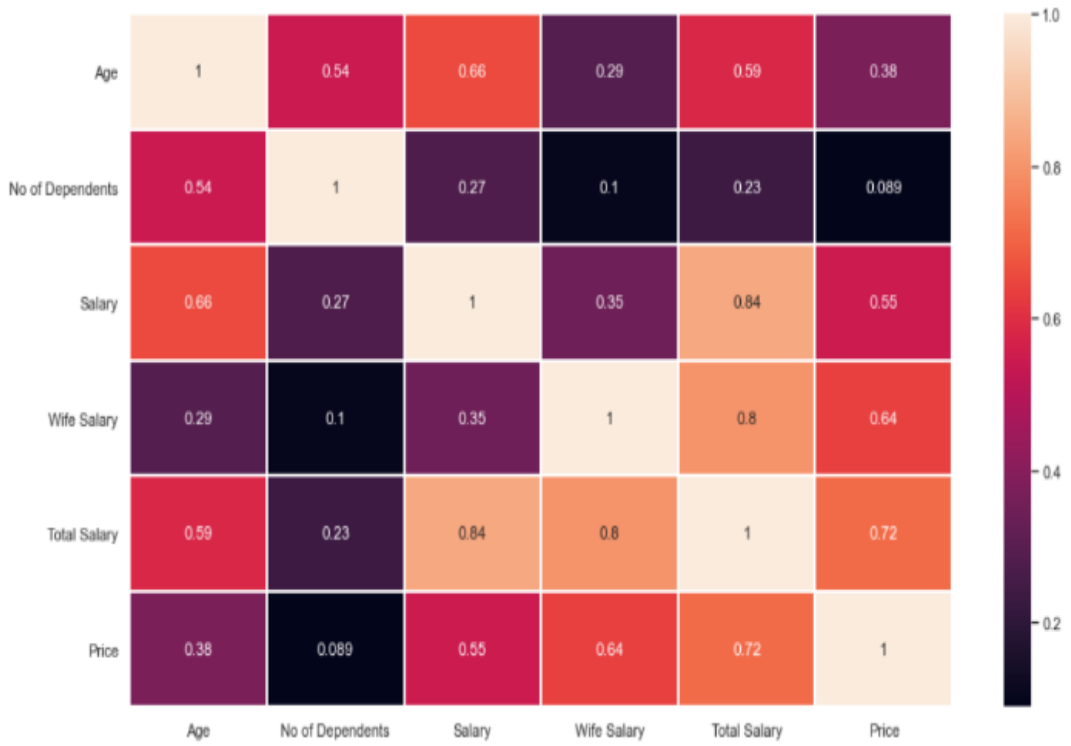
Plot showing the relationship between consumer education and the cars they buy



Observation :

In this plot, the likelihood of an undergraduate and graduate purchasing an electric car is equal.

Correlation Plot



This correlation map makes it evident which characteristics influence a person's purchasing choice.

TARGET SEGMENT

For **E2Ws** :

The company can target E2W vehicles in southern India due to high E2W sales in states like Karnataka, Tamil Nadu, Telangana, and Kerala. The focus should be on reliability, comfort, and service cost, as customers use these vehicles daily. Age doesn't matter, as people of all ages are interested in E2Ws. Addressing concerns about range, service costs, and battery safety can build customer trust and business growth.

For **E4Ws** :

The company can target E4W vehicles in southern India due to high E4W sales in states like Karnataka, Tamil Nadu, Telangana, and Kerala. Focusing on performance, range, and service cost, the company can build customer trust and grow the business. Age doesn't matter as people from all age groups are interested in adopting E4Ws.

MARKETING MIX

Understanding production costs is crucial for setting product prices. The Marketing Mix helps plan a successful offering, determining product suitability for customers. It also aids in developing effective marketing strategies and adjusting based on product characteristics and customer price sensitivity.

The 4Ps helps companies to review and define key issues that affect the marketing of its products and services and are often now referred to as the 7Ps framework for the digital marketing mix.

IMPORTANCE OF MARKETING MIX

This helps in understanding our product or service's potential, planning a successful offering, developing effective marketing strategies, and determining its suitability for our customers.

• Product: Manages concerns related to EVs.

• Price: Depends on service parts and battery cost.

• Place: Southern states ideal for initial high sales.

• Promotion: Based on analysis, more offers given to valuable segments.

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