



ELECTRIC TWO WHEELERS IN INDIA: AN OPPORTUNITY FOR SERVICE AND CONSULTING FIRMS

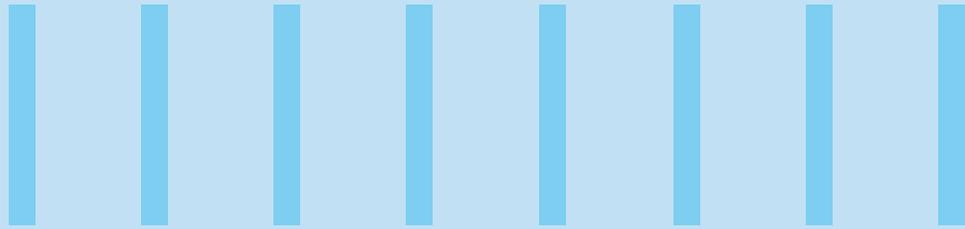


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PREFACE

The global automotive industry is experiencing a mobility evolution and pivoting to smart electric vehicles from conventional engine vehicles. Electric vehicles are not vehicles anymore, but technology products delighting users with connectivity and convenience.

In this Point of View, we analyze how and why the electric vehicle (EV) segment is registering exponential growth. All original equipment manufacturers (OEMs) are electrifying their fleet and ramping down production of their engine vehicles. The electric vehicle industry opens new opportunities in end-to-

end software development, maintenance, and service for both vehicle and charging infrastructure. We also explore how service and consulting firms can be catalysts in driving the EV automotive evolution and become a center of excellence in India's growth journey.

INTRODUCTION

The Indian start-up ecosystem is buzzing with smart electric vehicle, telemedicine, and online food delivery enterprises.

As sales of electric vehicles gather momentum, new and existing users are embracing smart mobility with thoughtful features such as curated music playlists and the ability to make and take calls and share messages without reaching out for a mobile device.

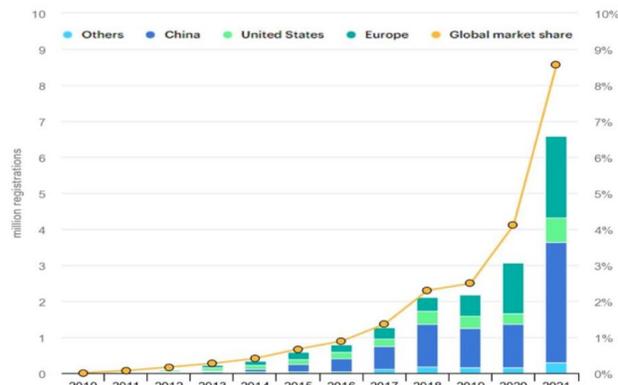
Smart and connected EVs are expected to go mainstream as pricing calibrates with market dynamics, the Government offers state and national subsidies, making India completely electrified by 2040.

1. EV MARKET OVERVIEW

Global EV Market

The global electric vehicle market registered sales of US\$ 244 billion in 2021 with a projected 33.5% CAGR from 2022 to 2030 aggregating US\$ 1,039 billion. In terms of volume, it rose to 6.6

million vehicles in 2021, doubling from 3 million vehicles in 2020. China has the largest share of the global EV market followed by Europe and USA. China registered the highest growth in the global EV market in the past five years followed by growth in Europe.



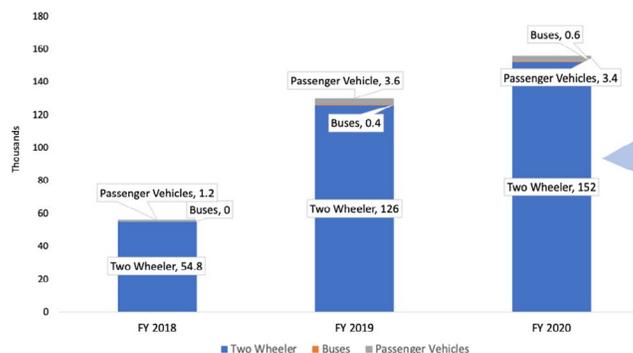
The global electric vehicle market stood at \$ 244 billion in revenue for the year 2021 with a projection of 33.5% CAGR from 2022 – 2030 jumping to \$ 1,039 billion

Image 1: Global EV market growth

Indian EV market

As fuel prices trend upwards and the Government of India extends subsidies, grants and additional state subsidies, electric vehicles are emerging as green shoots for the automotive industry. The Indian EV market is dominated by two-wheelers (2W) with a miniscule

representation of passenger vehicles and buses. This trend is reflected across the IC engine market as well where sales of two wheelers are registering steady growth. The sales of electric vehicles grew from 1,30,000 (FY 2018-19) units to 1,56,000 (FY 2019-20), of which 1,52,000 units originated from the electric two-wheeler segment alone.



The Indian EV market is dominated by 2W and about 80% of the vehicles sold in India every year are 2Ws

Image 2 : Indian EV Market split by form factor

The Indian Two-Wheeler EV Market

The Indian EV market has unique market dynamics.

The infographic above provides a snapshot of the Indian two-wheeler EV market over the years. Among electric two-wheelers (E2W), the most popular variant in India is scooters accounting for 97% of the market. The EV scooter market is dominated by slow speed scooters with 90% of electric scooters being slow speed scooters having a maximum speed limit of 25 kmph. The emerging trend is high speed scooters.

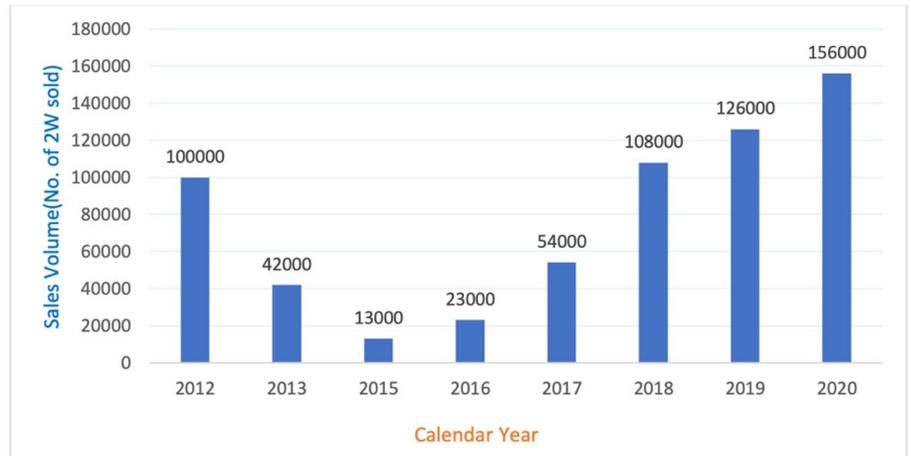


Image 3: Indian 2W EV market

2. A SNEAK PEEK INTO ELECTRIC VEHICLES

Typically, an EV is 70% software while the balance 30% is made of mechanical parts.

An EV has a dashboard similar to an i-pad mounted on the vehicle displaying speed, range, and the apps ecosystem.

The user can use this dashboard for playing music, calling, navigating to the destination, etc.

The user can connect headphones to this dashboard for a hands-free experience, change imagery of the display, and adjust sound / brightness. The dashboard provides live updates for all features.

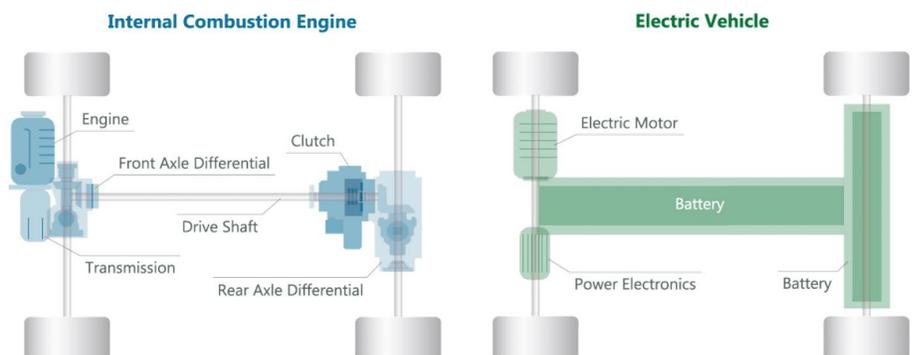


Smart dashboard of a scooter

These features function due to the interplay of hardware and embedded software. Moreover, the primary vehicle software incorporates this hardware and embedded software, thereby making the vehicle a smart, intelligent riding machine.

The infographic on the side illustrates the difference in the composition of the IC engine vehicles and electric vehicle with differences represented in the table.

The table lists the structural and architectural differences between an internal combustion engine and the electric vehicle. This dichotomy applies for two-wheelers as well as four-wheelers.



	IC Engine Vehicle	Electric Vehicle
Moving parts	Engine has more than 200 moving parts, including sub parts.	Parts replaced with an electric motor.
Difference in weight	IC Engine vehicle weight depends on transmission and weight of standard parts such as frame, tyre, etc.	Batteries and the frame protecting it accounts for the maximum weight.
Percentage of electronic parts	IC Engine vehicle has electronic controls made mandatory by Euro V and BS VI norms.	EV is made of 30% mechanical parts and balance 70% parts are controlled by software.
Cost	IC Engine vehicle's major cost is the cost of manufacturing moving parts and distributed across components.	The major cost of an EV is the battery and motor. The kWh cost has dropped from US\$ 1000/kWh to 200/kWh.

3. GROWTH LEVERS

Every year, India consumes 120 billion+ litres of oil on an average. The EV industry is a catalyst to reverse climate change and minimize India's reliance on crude oil.

a) The regulatory environment

The growth of the EV 2W market is attributed to several factors. On the one hand, the Government of India's EV policy promotes EVs. On the other,

the Government is discouraging ICE vehicles by implementing stringent Bharat Stage (BS) emission norms. In 2015, the Government launched Faster Adoption & Manufacturing of Electric Vehicles (FAME1) under the National Electric Mobility Mission Plan (NEMMP) 2020, which incentivised E2W and commercial vehicles. In 2017, BS IV norms reduced vehicle emission significantly, followed by the banning of two stroke engines. The next milestone was the implementation of BS VI.

FAME II was updated to boost EV adoption and incentivize users with an outlay of ₹ 10,000 crores.

b) Subsidy by the Government

The government has been incentivising EVs both at a national and state level, which has encouraged adoption. The table below demonstrates how the Government is incentivizing EVs:

Element	Non Electric	Electric
GST on vehicle	28%	5%
Road tax	9%	0%
Registration charges	5%	0% (in over 7 states with EV policy)
FAME Incentive	Not applicable	Rs. 15,000/kWh with the maximum subsidy capped at 40% of the vehicle cost
Tax incentive in Income Tax	Not applicable	Deductions upto Rs. 1.5 lakh for interest on loan taken for EV

18 states and Union Territories have developed their own state policies for further incentivizing customers to adopt EVs.

c) New start-ups - (new EV OEMs)

Industry data reveals 480+ EV start-ups in India ranging from EV manufacturers such as OLA Electric, Ather Energy and Simple Energy to charging infrastructure providers, component manufacturers, and fleet management enterprises. Investments in Indian EV start-ups by corporate, venture capital and private equity firms has grown by 170% with US\$ 376 mn invested in 2019, as compared to US\$ 147 mn in 2018.

d) The growing infrastructure

'Range anxiety' and anxiety for charging infrastructure has been addressed by the pace of electrification and charging infrastructure. The Department of Heavy Industries (DHI) along with state governments provides subsidies in setting up charging infrastructure

points. Tata Power and Reliance BP Mobility along with start-ups such as Exponent Energy, Log9 Materials and Sun Mobility are developing unique charging solutions.

e) Rising fuel prices

In 2022, the price of petrol is trending above the ₹ 100 mark. The elevated fuel prices increase the total cost of ownership for the end user, making EVs the preferred choice. A person travelling 30 km daily spends almost ₹ 2500 on fuel vs ₹ 150 per month, which makes the EV a viable choice.

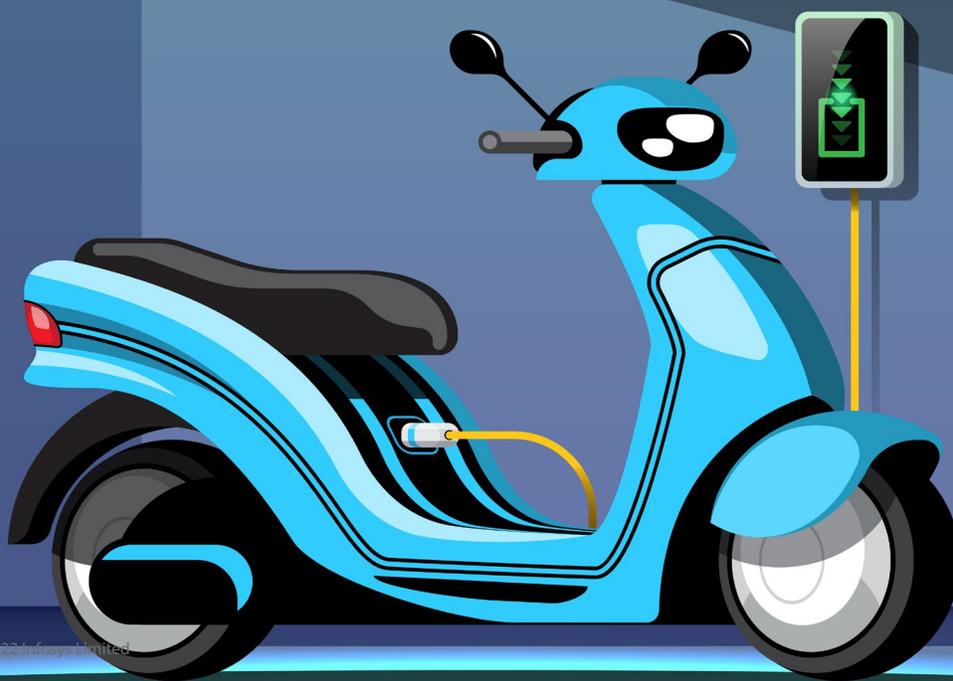
f) Manufacturers (legacy / existing OEMs)

Mainstream manufacturers such as TVS, Honda and Bajaj are investing significantly on EVs. Tata Motors, TVS, Hero Motocorp etc are opening a new entities for EVs. Global 2W and 4W manufacturers have set aggressive targets of electrifying their fleet to 50% by 2025 and completely electrifying by 2030.

4. CHALLENGES

EV adoption has its fair share of challenges:

- Public charging infrastructure and establishing seamless private chargers at home for vehicles with fixed batteries.
- Upfront price which is either at par with engine counterparts or 20-30% higher is a factor for the mass commuter segment
- Lack of awareness means buyers of two-wheelers do not understand that the total cost of ownership of an EV is significantly less than conventional vehicles.
- Battery replacement is a huge overhead cost. The battery needs to be replaced in 4-5 years of buying the vehicle. A typical scooter battery capacity is ~ 3kWh, which means replacing a battery costs half the price of the scooter.



5. OPPORTUNITY FOR SERVICE AND CONSULTING FIRMS

a) Software and platform management

EVs are connected vehicles. Being a computer on wheels, it allows the user to interact with the vehicle, making EVs smart devices. An EV has 70% software dependent parts compared to a conventional 2W which has 95% mechanical parts. The EV generates a huge volume of data, which is stored on the cloud for analytics to ensure safety and optimal uptime. Developers and platform engineers need to undertake smart and prompt coding of the embedded software for operating the hardware and similar coding for the main vehicle software. The automotive industry needs software talent with automotive domain expertise to keep pace with new trends and emerging needs. 2W manufacturers depend on software development experts who are exploring this shift in technology. Service and consulting firms should leverage their expertise and partner with EV

manufacturers. This partnership model is a win-win for both partners, leading to faster product development cycle and faster pace of solution development.

b) Charging infrastructure

A robust charging infrastructure network is imperative for the EV industry. Service and consulting firms should establish a Centre of Excellence to liaise between the Government, suppliers and EV companies and increase the speed and scale of solutions. Consulting firms can ensure smart and connected infrastructure by providing faster, best-in-class software solutions and 24x7 connectivity.

A rider needs to know the location of the nearest charging station, the current capacity, booking a slot, and online payment options. This packaged solution can be customized to the needs of the riders as well as the charging infrastructure companies.

c) Maintenance and support

The automotive industry is building capabilities for software development and data management. IT firms should reskill their talent to meet the needs of automotive clients. Skills in the areas of data storage and management, data analytics, cloud, platform management, and over-the-air (OTAs) updates are required for maintenance and support functions. EV manufacturers need to partner with service firms to better understand customer needs, industry trends and forecast future capabilities and emerging needs. In the 4W industry of Europe and the US, the trend is onboarding the IT & software partners for their expertise and this brings opportunity for Indian Service firms too to enter the market

6. CONCLUSION

The E2W market in India is growing at a rapid pace and projected to grow at a CAGR of 33.5% in the next eight years. Since 90% of electric vehicles sold are two wheelers, 2W manufacturers should engage with software service and consulting firms. It will be followed by electric car manufacturers, as car sales gather momentum.

Service and consulting firms can be catalysts in setting up EV charging infrastructure and maintenance, which requires liaisoning with the Government and global suppliers to orchestrate outcomes powered by software. In addition, the service and consulting firms need to leverage their capabilities to engage with charging infrastructure enterprises.



About the Authors



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Niketa has 8+ years of experience in the automotive, EV and consulting space. She has worked in the Strategy, Product and Program areas delivering best in class products, especially the E2W in India. At Infosys Consulting, she is working in the manufacturing domain for global client engagements.



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References:

- <https://tracxn.com/explore/Electric-Vehicles-Startups-in-India>
- <https://www.autocarindia.com/car-news/next-gen-toyota-yaris-to-debut-by-august-2022-421987>
- <https://www.financialexpress.com/auto/electric-vehicles/electric-two-wheeler-sales-increase-by-132-top-10-ev-players-in-india/2399833/>
- [http://www.researchandmarkets.com/reports/5465007/global-electric-vehicle-ev-market-%20value?utm_source=GNOM&utm_medium=PressRelease&utm_code=cqv72w&utm_campaign%20n=1617049+-+Global+Electric+Vehicle+Market+\(2021+to+2026\)+-%20+by+Pr oduct+Type%2c+Vehicle+Type+and+Region&utm_exec=jamu273prd](http://www.researchandmarkets.com/reports/5465007/global-electric-vehicle-ev-market-%20value?utm_source=GNOM&utm_medium=PressRelease&utm_code=cqv72w&utm_campaign%20n=1617049+-+Global+Electric+Vehicle+Market+(2021+to+2026)+-%20+by+Product+Type%2c+Vehicle+Type+and+Region&utm_exec=jamu273prd)
- <https://www.virta.global/global-electric-vehicle-market>
- <http://xn--https-ix3b//>
- https://www.greencarreports.com/news/1134999_global-ev-sales-more-than-doubled-in-2021-vs-2020-tripled-vs-2019
- <https://www.ev-volumes.com/>

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