



Live Project Evaluation Final Evaluation – Corporate Mentor

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Group No. 20

Project Title : Conduct secondary research and Online Primary & Secondary Research to understand the key problems that the Battery Pack Manufacturers & Fleet Operators in the Electro Mobility Economy face

Name of Company : iRasus Technologies

Name of Evaluator : Arjun Sinha Roy

Evaluation Grid :

Parameters	Score (Out of 100%)
Content, accuracy, fit with objectives and company brief	90
Structure, language, free from errors	95
Timeliness, adherence to milestones	90
Methodology and rigour	95
Relevance & implement-ability of the conclusions and recommendation	90

Comments : I think the team has put in a lot of effort in putting together this report and study. The industry is new and the variables in the industry are still evolving. Given the same the report has actually been far ahead of my expectation.

Signature of Evaluator

Arjun Sinha Roy
Digitally signed by
Arjun Sinha Roy
Date: 2023.04.09
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Executive Summary

This report collates all primary and secondary research done keeping in mind the end goal of iRasus –

- To understand the problems faced by the stakeholders in the EV battery value chain
- Create metrics to quantify those problems
- Create framework to measure
- Integrate the findings in a cloud-based platform for EV battery health analysis and service

Current status of EV market in India have been thoroughly understood. Data about current battery pack manufacturers in India, EV fleet operators and the changing technology trend has been studied. The standing of Indian EV ecosystem as compared to that of China has been mapped to understand the possible future of Indian EV market in coming years.

This report has been made under the guidance of faculty mentor, Dr. Umashankar Venkatesh and Mr. Arjun Sinha Roy (Director & Founder) as our industrial mentor.



Chapter1: Introduction

iRasus Technologies is working on building a digital Infrastructure platform to connect Batteries in the Electro Mobility domain to the cloud. The Data collected through this results in a digital twin of the Battery which allows us to understand the battery performance real time. We need the same as batteries are the most crucial element of the Electric Mobility Eco-system and is barely understood.

The Key data needed is – what are the current and upcoming challenges faced by the above-mentioned segments. What are the current methods being adopted by the Organizations to solve the problems.

Data needed would include issues around

1. Usage of Battery
2. Warranty Claims
3. Improper Usage
4. Heat Issues
5. Safety Issues
6. Issues around Range Anxiety

The above is an indication of the issues that could come as feedback from the stakeholders. The data collected above needs to be collected and analyzed for Trends. The trends would give insights to –

1. Issues and remedies related to Battery performance due to structural or design issues
2. Issues related to Battery performance due to component issue
3. User Behavior Issues
4. Compliance and Safety Related to Data
5. Policy Impact of Data



6. New revenue Opportunities around the data analysis
7. Feature requirements in Batteries and Software to address the issues

Competition Analysis – Work with the iRasus Team to understand the competitors and their platform features

Recommendations – The team should be able to help understand the current issues around the Electro Mobility Sector and how features on the Preksha Platform 1 could be used to address the issues.



Chapter 2: Literature Review

Marcello Contestable, Dr. Gregory Offer, and Dr. Robin North present Electric Vehicles: A Synthesis of the Current Literature with a Focus on Economic and Environmental Viability. - According to a research, the longer-term adoption of EVs will be significantly impacted by improvements in battery technology, which will reduce costs and increase energy density, as well as the establishment of a suitable recharging infrastructure. (2012) Marco Contestable

By Praveen Kumar and Kalyan Dash, "Potential Need for Electric Vehicles, Charging Station Infrastructure, and its Challenges for the Indian Market" - India might invest in modest reinforcements to deal with the load challenges locally rather than undertaking a radical change. Promote the use of home charging. Planning for the placement of the vast scale charging infrastructure is essential before it is implemented along with population, congestion, and safety must be taken into account. It is crucial to integrate activity in the transportation and energy sectors. Development objectives through various cutting-edge policies and programs, such as:

- ✓ Financial consumer incentives provided to owners of electric vehicles.
- ✓ Free parking
- ✓ Access to limited highway lanes
- ✓ Tax credits
- ✓ Purchase subsidies
- ✓ Discounted tolls

All of these will contribute to the market's growth. (2013) Dash P. K. Which Technology for an Urban Distribution Center: Conventional, Hybrid, or Electric Vehicles? by Cedric De Cauwer, Joeri Van Mierlo, Cathy Macharis, Philippe Lebeau - Freight transit has a big influence on urban mobility.

The study examined how electric cars may be used for urban logistics. Last-mile costs might be reduced by employing a fleet with a range of technologies. The study offered a fleet size and mix car routing job with time windows for EVs. The main contribution of the authors was accounting for the volatility in the EV range. In the compact van market, electric cars are frequently the most competitive technology. Diesel fuel is becoming more and more prevalent in the enormous automotive industry.



Electric car choices among consumers, by Fanchao Liao, Eric Molin, and Bert van Wee - Utilizing EVs on a large scale may help address problems including environmental pollution, global warming, and oil reliance. Governments have implemented aggressive marketing strategies, yet EV penetration is still very low. To help policymakers and offer direction for future research, they offered a complete overview of studies on consumer preferences for EV.

They contrasted the psychological and economic explanations for people's preference for electric vehicles. In general, it is found that EVs' financial and technical qualities, such as their up-front and ongoing prices, range, charging times, driving range, vehicle performance, and brand diversity on the market, have a big influence on how useful they are. the benefit and advancement. The usefulness and promotion of EVs are also positively impacted by the density of charging stations. Fanchao Liao, 2017)

International Council on Clean Transportation: Lingzhi Jin, Peter Slowik - Although the electric car market is still expanding, there are a number of obstacles that are preventing their general adoption. These obstacles include the new technology's higher price, relative annoyance as compared to range and recharge durations, and consumer ignorance of the technology's practicality and availability. This final point—often referred to as "customer awareness"—is very important. (Lingzhi Jin, 2017)

Study on Electric Vehicles in India Opportunities and Challenges: by Mohamed M, G Tamil Arasan, and G Sivakumar - Electric engines will replace internal combustion engines (ICE) in a way that greatly reduces pollution and benefits consumers. This technology has been adopted by numerous nations, which is helping the environment. The study observed the opportunities and difficulties associated with deploying EVs in India.

Government initiatives, batteries, industries, and the environment have all been taken into consideration. These difficulties, including the price of EVs, their effectiveness in India, and demand for EVs, were taken into account. India's adoption of EVs is primarily intended to reduce greenhouse gas emissions and oil costs. The government must make the most of the chances at hand and develop effective solutions to the problems. (Mohamed M, 2018)



Chapter 3: Methodology

In order to conduct Primary & Secondary research, we shall be devising a framework for developing the strategy for the above-mentioned stakeholders.

1. **Preliminary data mining:** A wide range of raw market data is gathered and compiled. Knowledge the whole value chain is crucial for a thorough understanding of the industry, and we collect data from battery pack makers and fleet operators to make this process easier. Additionally, industry dynamics about battery consumption, heat and safety concerns, warranty claims, limitations, and pricing trends are gathered. to do secondary study to comprehend the development of this market size? To discover the causes of EV battery usage and to determine why it is not operating in India, for example, what size are 2-wheelers, 3-wheelers, EV buses, and EV scooters in India.
2. **Research models:** Via observations and the primary research (Ethnographic research) along with secondary research will be carried out for the relevant departments, stakeholders & other manufactures and operators. This is critical for a deep understanding of the industry as well as ensuring minimal errors. Some of the parameters considered for forecasting include:
 - Battery unavailability in market and restrains, along with their current and expected impact.
 - How is the adoption of EV are happening? Challenges people are facing in transition (Lack of education, infrastructure etc.) & at the end respond to those challenges
 - Warranty Claims and supply v/s price trends
 - Compliance & safety related data
 - Global practices vs India

To generate an analysis for the concerns, we weigh these characteristics and use weighted average analysis to evaluate their market effect.



Progress Report

Objectives

Till mid-term evaluation

1. Research about the EV Battery Pack Manufacturers.
2. Research about the EV Car Manufacturers.
3. Research about the EV fleet operators.
4. Map EV fleet operators to EV Battery Pack Manufacturers
5. Research about the EV market in India
6. EV battery pack cost evaluation over the years
7. Map the growth of Chinese EV market with Indian EV market Growth
8. Research the future of hybrid models in the Indian EV ecosystem.
9. Research about the current battery pack characteristics
10. Research about the Regenerative Hybrid Technology

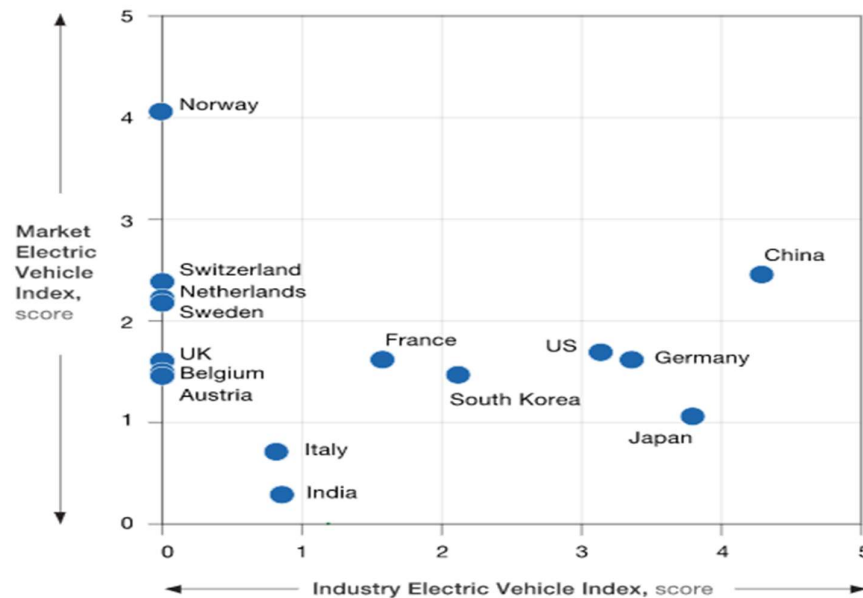
EV Ecosystem in India

Electric Vehicle Index

Primary research to find out the current position of India as compared to global EV ecosystem. In comparison to advanced nations in EV ecosystem India is still in a nascent stage. There is scope for heavy investment & high potential for adaptability. Great deal of technological prowess is required.



Electric Vehicle Index (EVI) development
of selected countries, score out of five



Market Electric
Vehicle Index,
rank

- 1 Norway
- 2 China
- 3 Switzerland
- 4 Sweden
- 5 Netherlands
- 6 US
- 7 France
- 8 UK
- 9 Austria
- 10 Belgium
- 11 South Korea
- 12 Germany
- 13 Japan
- 14 Italy
- 15 India

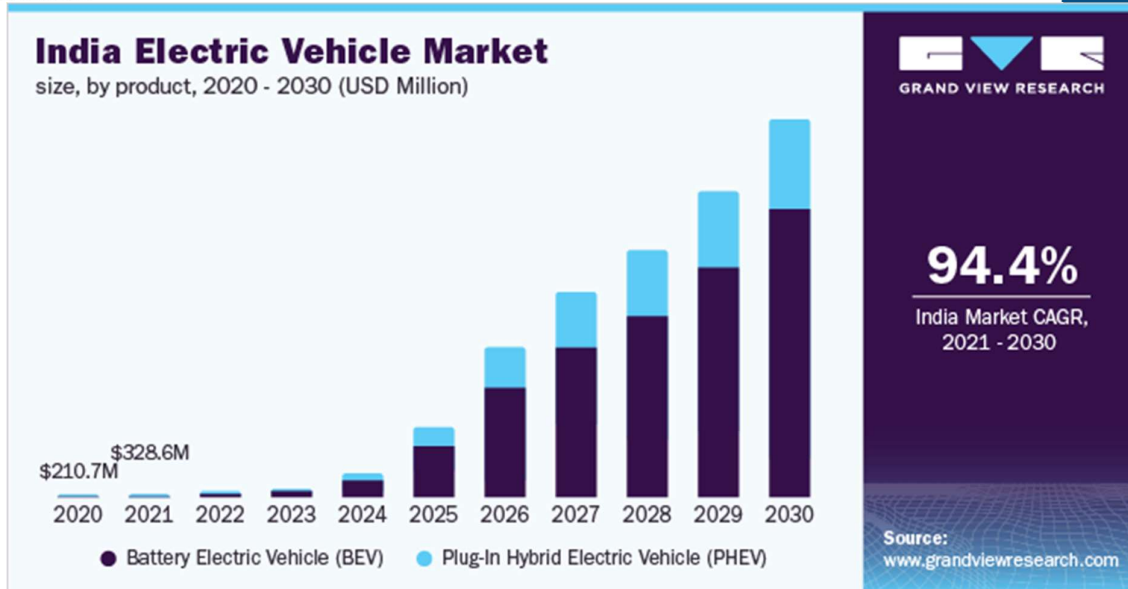
Industry Electric
Vehicle Index,
rank

- 1 China
- 2 Japan
- 3 Germany
- 4 US
- 5 South Korea
- 6 France
- 7 India
- 8 Italy

McKinsey&Company

Growth of EV market share

Primary research to find out the growth forecast of EV mobility ecosystem in India. India has a high growth market on the EV domain. The statics show in future Indian consumers will prefer Battery-based Electric Vehicles more than Plug-in based Hybrid Electric Vehicles.



Government efforts in EV adoption

The Indian EV ecosystem is rapidly evolving, with an increased emphasis on the development and adoption of hybrid vehicles. The government's efforts to promote EVs, combined with rising demand for environmentally friendly vehicles, are expected to drive hybrid model growth in India in the future.

1. **Government subsidies:** The Indian government has launched a number of initiatives to encourage the use of EVs, including tax breaks, subsidies, and exemptions. These incentives are expected to persuade more consumers to buy hybrid vehicles, which are regarded as a more cost-effective alternative to fully electric vehicles.
2. **Cost advantage:** Because hybrid vehicles use a combination of conventional fuel and electric power, they are frequently less expensive than fully electric vehicles. This lowers the upfront cost for consumers and provides them with a more cost-effective option than fully electric vehicles.



3. **Improved fuel efficiency:** Hybrid models are known for their improved fuel efficiency, which can help consumers reduce operating costs. This is especially useful for those who drive long distances because it reduces the amount of fuel required.
4. **Range anxiety:** One of the most difficult challenges for fully electric vehicles is the fear of running out of power before reaching a charging station. Hybrid vehicles provide a solution to this issue because they have a backup fuel source that can be used to extend driving range.
5. **Technological advancements:** Hybrid vehicles are becoming more sophisticated, with technological advances improving their performance and making them more environmentally friendly.

Finally, the future of hybrid models in India appears promising, as the country strives for a more sustainable and environmentally friendly future. Demand for hybrid vehicles is expected to rise as the Indian EV ecosystem develops and technological advancements make hybrids more appealing to consumers.

Here are a few hybrid models that are currently available or will be available in the Indian EV ecosystem:

1. **Toyota Camry Hybrid:** A popular luxury sedan in India, the Toyota Camry Hybrid is known for its fuel efficiency and low emissions.
2. **Maruti Suzuki Ertiga Hybrid:** A popular MPV in India, the Maruti Suzuki Ertiga Hybrid is known for its spacious interior and fuel-efficient engine.



3. **Mahindra eKUV100:** The Mahindra eKUV100 is a compact electric SUV that will be available in India soon. It will have a range of up to 140 kilometres on a single charge, making it an appealing option for customers looking for a compact and environmentally friendly vehicle.
4. **Tata Altroz EV:** The Tata Altroz EV is an electric hatchback that will be available in India in the near future. It will have a range of up to 300 kilometres on a single charge and is expected to be a popular choice for consumers looking for a low-cost, environmentally friendly vehicle.
5. **The Hyundai Ioniq:** Electric is a popular electric hatchback in India, known for its low emissions and high fuel efficiency.

These are just a few hybrid models that are currently available or will be available in the Indian EV ecosystem. With the growing demand for EVs, more hybrid models are expected to be introduced in India in the future.

Growth with respect to LHV

Here are some similarities between the 2 & 3-wheeler segments and hybrid vehicles:

1. **Cost advantage:** Because hybrid vehicles use a combination of conventional fuel and electric power, they are less expensive than fully electric vehicles. This lowers the initial cost for consumers, making hybrid vehicles more affordable.
2. **Improved fuel efficiency:** Hybrid vehicles, including two and three-wheelers, are known for their improved fuel efficiency, which can help consumers reduce operating costs. This is especially useful for those who drive long distances or frequently use their vehicles.
3. **Government incentives:** To encourage the adoption of EVs, the Indian government has launched a number of initiatives, including tax rebates, subsidies, and exemptions. These



incentives are expected to encourage more consumers to buy hybrid vehicles, such as two and three-wheelers, which are considered a more cost-effective alternative to fully electric vehicles.

4. **Technological advances:** Hybrid vehicles, including two and three wheelers, are becoming more sophisticated, with technological advances that improve their performance and make them more environmentally friendly. This is expected to boost demand for hybrid vehicles, including two and three-wheelers, in India in the future.

Overall, the similarities between the two and three-wheeler segments and hybrid vehicles stem from the cost advantage, improved fuel efficiency, and government incentives that are driving hybrid vehicle growth in India. With the growing demand for EVs, more hybrid 2 and 3-wheeler models are expected to be introduced in the future.

Regenerative Hybrid Technology

By reducing fuel consumption, regenerative (REGEN) braking is a useful technique for extending the range of hybrid electric vehicles (HEV). There are several technological methods for storing the braking energy produced during a deceleration action. Those have so far undergone various stages of development.

Is regenerative braking good for battery?

Cycling up to 200,000 km demonstrates that regenerative braking improves battery lifespan by lowering the cycle depth. This significantly reduces the capacity fading and resistance rise.

What are the benefits of regenerative braking?

Regenerative braking's primary objective is to recharge the batteries to increase range, but it also significantly lessens wear and tear on the standard mechanical brake system, lowering maintenance costs. The slightly different driving experience between EVs and hybrid vehicles is another negative consequence.



How long do regenerative brakes last?

It depends on their use and on how much the driver relies on the regenerative braking system. Brake pads on these vehicles last at least twice as long as they do in conventional vehicles: for 80,000 miles or more.

Can regenerative braking overheat?

There is really no risk of the regenerative braking system overheating or breaking down. It is true that you won't be able to employ regenerative braking after your battery is full because, to put it simply, there is nowhere to put the electricity you are producing.

***Maruti looking at regenerative braking hybrid technology. ***

Smart Hybrid is a cutting-edge technology that helps improve driving performance and fuel efficiency. In both manual and automatic transmissions, the engine automatically shuts off while idling and begins quietly when the ideal circumstances are met. It has two batteries, one of which is a lithium-ion battery. These large-capacity batteries help the idle start-stop and torque assist features of the engine by storing the energy produced during braking. The energy in the lithium-ion battery aids in acceleration, enabling the engine to accelerate and function at its best.

Advantages

- **Performance**

The Smart Hybrid system has a lithium-ion battery and a lead-acid battery setup, as well as an Integrated Starter Generator (ISG). The kinetic energy generated during braking and deceleration is turned into electrical energy and then stored in this dual battery system.



- **Enhanced Fuel Economy**

The Idle Stop Start feature found in Maruti Suzuki Smart Hybrid vehicles is responsible for this benefit. As soon as you let go of the clutch, the engine shuts off while the vehicle is at a complete stop. And the moment you press it one more, the engine begins again.

The brake pedal's function is the same in automatic versions; the engine stops when the pedal is depressed and restarts when it is depressed again. In this regard, the Vitara Brezza and S-Cross serve as excellent examples of Smart Hybrid automatic vehicles in India, whose fuel economy ratings are on par with those of manual gearbox models.

- **Reduction In Emissions**

ISG also has a motor purpose. The Torque Assist feature is activated by ISG when the vehicle accelerates from a stop and begins to gain speed in order to complement the engine's power. You receive improved pickup as a result, and the engine's workload is decreased.

Due to the advantages, they provide, Smart Hybrid vehicles are a great choice if you care about the environment and want to keep your fuel costs down. It is an automobile technology that is useful in the real world in that sense.

Indian EV Battery Ecosystem

EV battery market share 2022

- Primary research to find out the types of EV battery and their current market share in India
- Comments –

The finest batteries for electric cars are without a doubt lithium-ion battery.

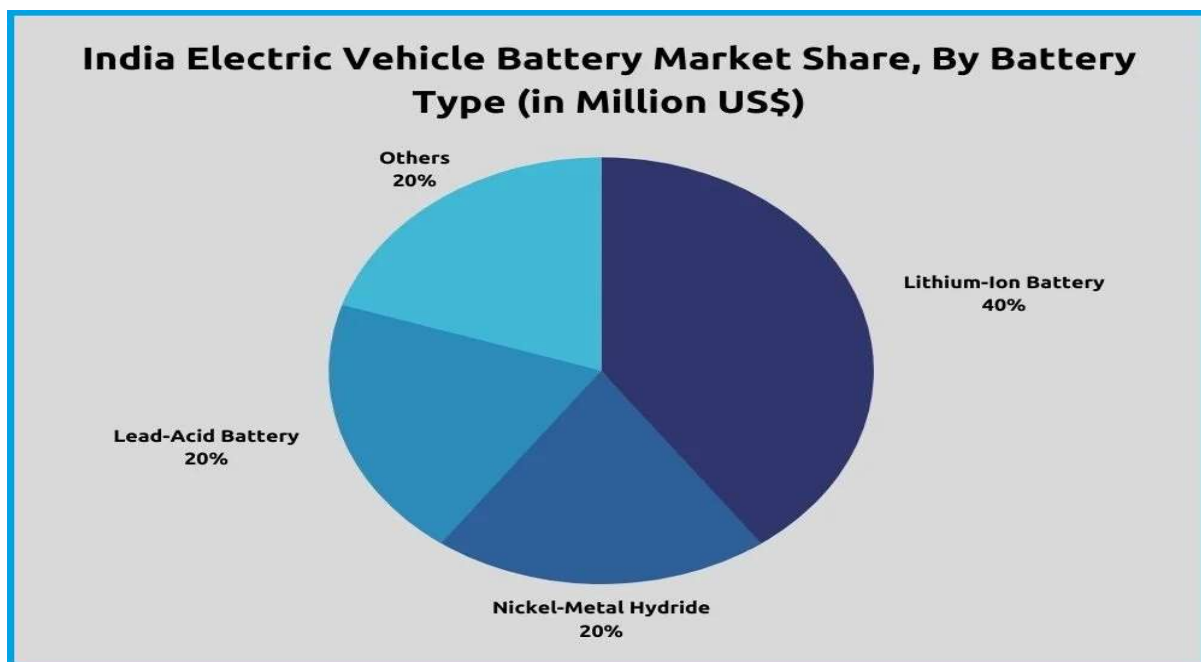
The yearly lithium-ion battery market in India is expected to grow at a CAGR of 37.5% to reach 132 GWh in 2030, according to JMK Research.



As I've already said, the battery pack represents between 40 and 50 percent of the price of an EV. And the cost of a battery pack is primarily made up of the cell.

Unfortunately, India relies on imports from China and Taiwan because it lacks the capacity to produce lithium ion batteries at this time.

The lithium-ion battery industry in India is now "fragmented" (a highly competitive market without dominant companies), but it is anticipated that significant firms would enter the market in the years to come.



EV battery demand growth

- Primary research to find out the growth in demand for EV battery in India mapped to types of vehicles
- Two-wheelers and passenger cars show most demand potential, hence battery packs should be designed based on the carrying size, optimal weight, and cycle time required by these two modes



Exhibit 1: Estimated battery demand for electric vehicles in India in GWh

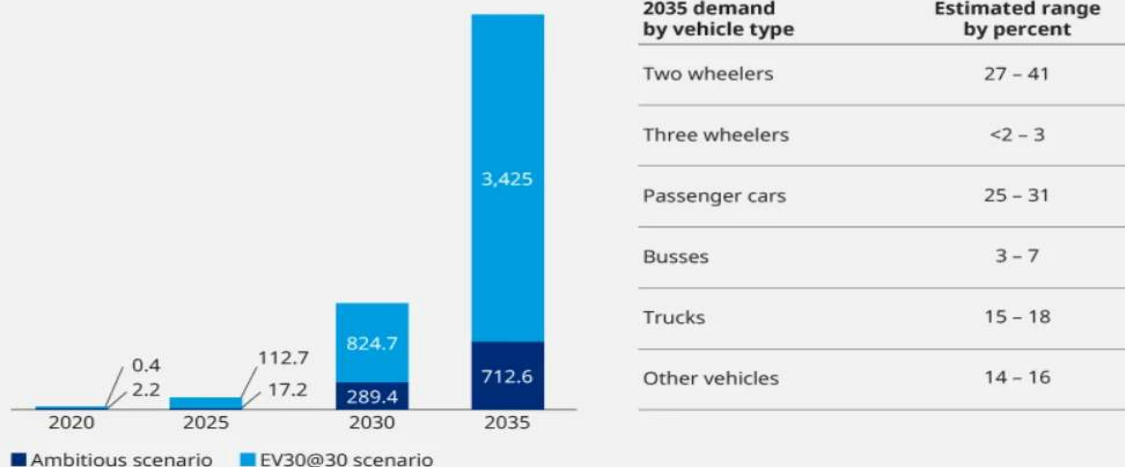
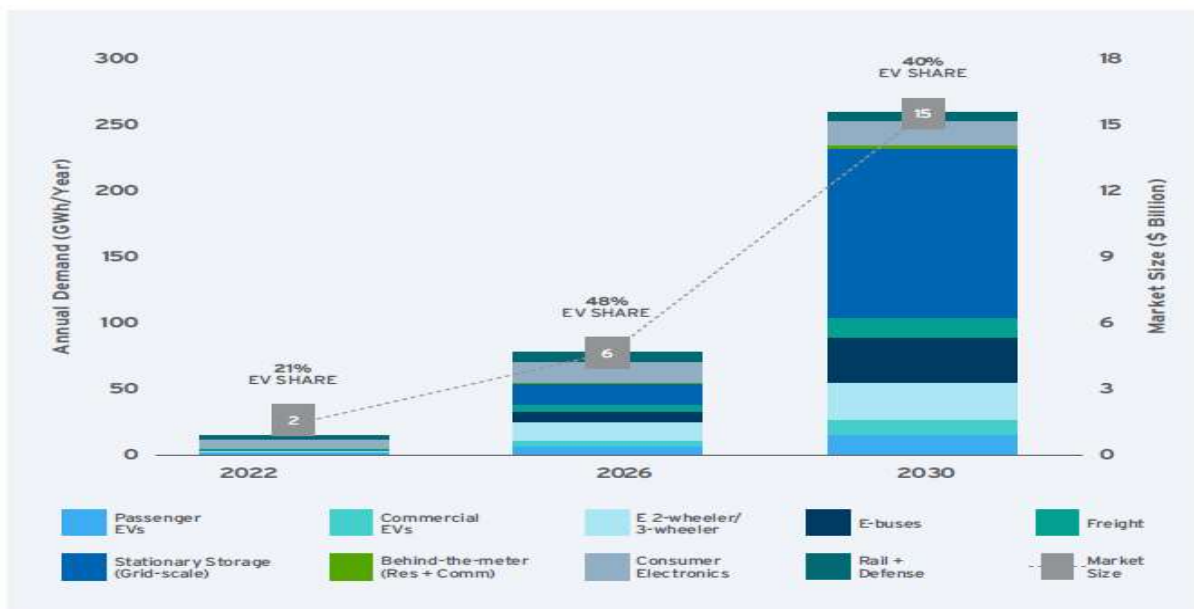


Exhibit 12 Indian Battery Demand Outlook—Accelerated Scenario²⁶





EV Battery Manufacturing Ecosystem In India

EV Battery Pack Manufacturers

- Primary research to find out the battery pack manufacturers (existing and in plan) in India
- Comments – 14 battery pack manufacturers identified with significant plans to grow in the EV ecosystem

Company	Some Information
Amara Raja Batteries	<ul style="list-style-type: none"> • At its Tirupati site in Andhra Pradesh, India's first technical hub for the development of lithium-ion batteries. • Rs 200 M investment for the hub • Tech transfer agreement with ISRO • Started supplying Lithium-ion batteries to three wheelers • Invested in Log9 & InoBat to get lithium cell manufacturing tech.
Exide Batteries	<ul style="list-style-type: none"> • JV with Leclanche to build lithium-ion batteries focusing on e-transport, storage systems • Plans to invest Rs 60 billion to build a lithium-ion cell manufacturing facility in the nation in association with SVOLT Energy Technology of China.



Tata Power/Chemicals	<ul style="list-style-type: none"> • Building ecosystem for EVs • MOU with ISRO • Created e-charging stations for the convenience of owners of electric vehicles at Kolte-Patil Developers' (KPD) developments in Pune, Mumbai, and Bengaluru.
Hero Motocorp	<ul style="list-style-type: none"> • With a roughly 34.6% ownership share in EV startup Ather Energy, the company has a toehold in the domestic electric vehicle (EV) market. • Contributed to Gogoro, a company most recognised for its infrastructure of interchangeable batteries and electric smart scooters.
Maruti Suzuki	<ul style="list-style-type: none"> • JV with Toshiba and Denso to produce lithium ion battery packs • Produces hybrid cars with different chemical composition • Signed memo with Gujarat govt. To invest in EV batteries
Future Hi-tech Batteries	<ul style="list-style-type: none"> • The battery systems are sufficiently equipped and productive to make room for cutting-edge lithium technology.
Manikaran Power Limited (MPL)	The green light has been given for Manikaran Power Limited, or MPL, to enter the electric vehicle ecosystem.



	The company's effort will be centred on creating the best lithium hydroxide for batteries.
Esmito	<ul style="list-style-type: none"> • Esmito provides EV Charging Operators with a customizable end-to-end EV Charging Management Solution that simplifies the management and control of their assets. • Esmito offers a variety of lithium-ion batteries for three- and two-wheeled electric vehicles. Their state-of-the-art battery assembly plant can build 48V, 60V, and 72V battery packs using their May-enabled intelligent BMS.

Company	Some Information
Li-S Energy	<ul style="list-style-type: none"> • To develop a battery technology that uses more advanced lithium-sulfur chemistry and has battery components that contain BNNTs and other nanomaterials. • Li-S Energy and BNNTTL have agreements in place for the supply of BNNTs and the exclusive distribution of BNNTs to the battery sector for the production of lithium-sulfur batteries. • Initial testing has shown that the Li-S Energy lithium-sulfur batteries outperform



	conventional lithium-sulfur batteries in terms of capacity, performance, stability, and cycle life.
Inverted Energy	<ul style="list-style-type: none"> The lithium battery market is led by Inverted. Inverted was founded as a company to help the world make the transition to future energy storage and mobility. It has made a name for itself as one of India's top EV battery manufacturers.
Patich Energy Solutions	<ul style="list-style-type: none"> Lithium product development, operations, and related products are the company's main areas of focus.
Trontek	<ul style="list-style-type: none"> Offers reliable lithium-ion batteries for a variety of plug-in hybrid and electric vehicle types. Markets across the USA and a few parts of Europe are served by Trontek.
Green Fuel Energy	<ul style="list-style-type: none"> The company believes that fleet operators (L5 category high-speed 3-wheelers) and medium-to-high-speed two-wheelers involved in last-mile deliveries and passenger transportation are the key drivers of demand for its battery solutions. The company opened its lithium-ion battery manufacturing in October 2018 as part of its diversification strategy.



Reliance Industries Ltd.	<ul style="list-style-type: none"> • Mukesh Ambani has made it plain that he intends to enter the EV market as a producer of EV batteries rather than an electric vehicle manufacturer. • Applied for the PLI programme for Advanced Chemistry Cells used in battery manufacturing. • Acquired Faradion and became one of the pioneers in the global sodium ion battery industry. • Declared the purchase of Lithium Werks BV.
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Trontek Market in India

Products

Lithium-ion batteries for MHE

Lithium-ion batteries for electric rickshaws;

Lithium-ion batteries for electric bikes;

Lithium-ion batteries for solar street lights;

EVSE (Electric Vehicle Supply Equipment)

Currently, Trontek is the market leader for EV batteries in India. Trontek has established a solid foothold in the quickly expanding EV battery market thanks to the first-mover advantage and technological advancements incorporated in the Battery Management Systems created by the R&D team as the company established itself as one of the most credible brands offering world-class products in India.



With a strong focus on the electric two and three-wheelers that comprise a significant share in the auto OEM segment, it is working with most of the leading OEMs across the country. The company has sustainability as the foundation of its business. Being a responsible alternative energy solution provider, it makes eco-friendly batteries to power life and energizes the future.

FARADION technology

Sodium-ion cells

Since sodium-ion cells offer a significantly greater range and carrying capacity for a comparable price, they are an excellent drop-in replacement for lead-acid batteries in LSEVs, e-scooters, or as batteries for e-rickshaws and e-bikes.

They may also be utilised with a 48V or 12V S-L-I (starter-lighting-ignition) battery from an MHEV (mild hybrid electric vehicle). This is because lead acid batteries have a lower energy density and Na-ion batteries perform better across a broader temperature range. Through the Innovate UK-funded projects Sodium-ion Batteries for Electric Vehicles and Sodium-ion Batteries for Automotive Power Applications, Faradion is collaborating with others to show how Na-ion batteries may be used in automotive applications.

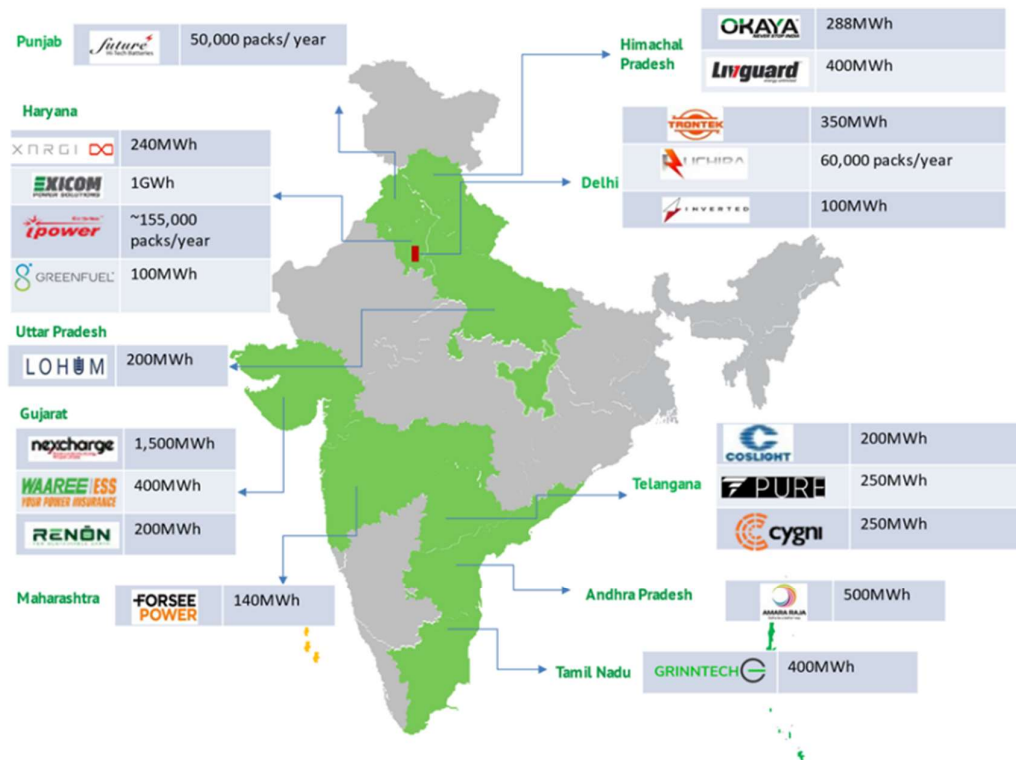
When we introduced our e-bike, it was the first vehicle ever powered by sodium-ion batteries.

Reliance acquired 100% Stake in Faradion Ltd. At its projected fully integrated energy storage gigafactory, which will be a part of the DAGE i.e. Dhirubhai Ambani Green Energy Giga Complex in Jamnagar, western India, Reliance aims to use Faradion's technology.

Chapter 4: Analysis and Inference

Location of EV battery Pack Manufacturers and Key Stakeholders

Figure 2: Existing Capacities of Key LiB Battery Pack Manufacturers

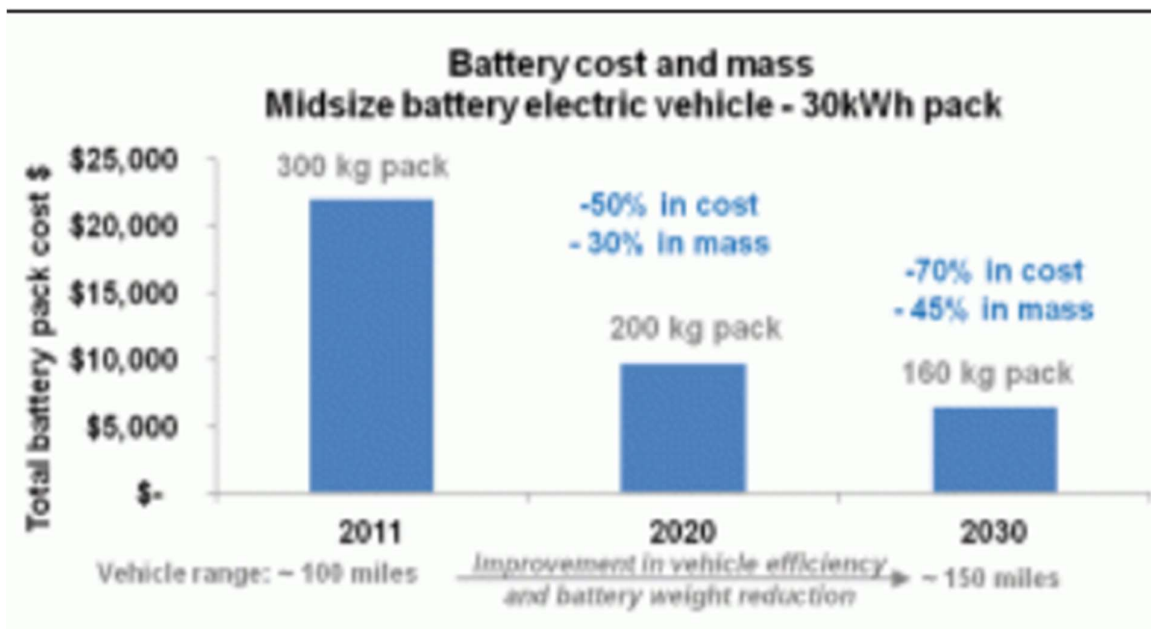


Source: Industry News Articles, Interview Insights, JMK Research.

Note: Data represented above for some key players only whose information we were able to source. Other prominent players include Pastiche Energy Solutions (P) Ltd. (Panchkula, Haryana), Fusion Power Systems operating under the 'Amptek' brand (Gurugram, Haryana; New Delhi), CTech (IMT Manesar, Haryana), Maxvolt (Noida, Uttar Pradesh) Vision

Battery packs cost evolution over the years

- Primary research to find out the change in EV battery pack weight and cost over the years
- Comments – Significant decrease in pack weight and price (due to economy of scale and technology) over the years.



Cost of battery pack per mileage, cost of making a battery, cost of running a battery

Between January 22 and December 22, the cost of Electric Bike Batteries products ranges from 13,100 to 26,500 per piece. These are illustrative figures derived from the costs of popular goods.

One-cycle Cost, Range and Information –

A battery simply goes through one battery cycle when it is discharged to a specific level and then fully recharged. Traditionally, a full cycle would be defined as one full discharge and one full recharge.

One cycle cost for a 2-wheeler EV battery has been in the range of 14–25p/km (based on running 60 km per day), 4.20–6 INR every day, and 1260–1800 INR per year.

A number of factors, like your location, the time of year, and even the hour of the day when peak rates are in effect, affect electricity pricing. Electricity use and costs are frequently lowest late at night.

Cost of Charging an EV will fluctuate between – 5-25 INR per full charge, and give a range of 60-150 kms



Assured Cycles -

A battery experiences several recharge and discharge cycles during typical use. The quantity of charge and discharge cycles a battery may go through while still retaining the majority of its performance is known as its life cycle. Now, with each charge cycle, the battery gradually loses its capacity to hold a full charge, which over time would lead to decreased performance (reduced range and faster discharge).

Before losing capacity, a typical Li-ion battery can withstand 500 to 1000 charge/discharge cycles. This is 5000 to 15,000 kilometers for an ordinary electric scooter

Then there is the price of replacing the battery. Batteries for high-range two-wheelers typically last 2-4 years. After four years of use, it is anticipated that high range E2W model batteries will cost between INR 40,000 and INR 45,000 to

Cost of the electric bike battery-

The price of a new electric bike battery would range from Rs. 37,000 to Rs. 45,000. It depends on both the capacity and the brand of the battery. This price is for a battery with a capacity of between 400- and 700-watt hours. The cost of the name brand battery is significant and leans toward being a costly choice. Battery packs under the Bosch name might cost you anywhere from Rs. 50,000 to Rs. 70,000, with an average price of about Rs. 128/Wh. The batteries made by the company slant toward the pricey end. Chargers for Shimano STEPS: The average cost per Wh of the offered capacity for these batteries is roughly Rs. 130/Wh, with prices ranging from Rs. 38,000 to Rs. 50,000.

Cost of running an EV 2-wheeler battery per year -

The annual mileage, assuming six days per week of travel, is around 12,500 kilometers if the entire daily commute distance in a major metropolis is 40 kilometers. A typical petrol scooter gets 45 to 50 km per liter of fuel. This amounts to roughly 250 liters of fuel annually, which is priced between Rs 21,000 and Rs 25,000. (Based on current gas costs in different cities)

For EV - charging cost+ battery replacement cost after end of 2-4 years

→ 1500 + 10000 = 12000 approx.



Cost of Battery pack per mileage -

cost of battery pack = 50000 INR approx.

total running – 60 kms per day * 365 days * 4 years= 87600

Hence, Cost of Battery pack per mileage = 50000/87600 = 0.57

Electric Vehicle Operators in India

- 7 EV fleet operators identified
- Comments – Not yet significantly into the market, small in size, huge growth potential, substantial investment plans

Company	Charging station Partner	Batter Pack Supplier
1. Prakriti E-Mobility Pvt. Ltd. (Evera)	Okaya Power	Tata Motors
2. Mahindra backed meru cabs	Looking for partner	Tata green
3. Lithium urban technologies	Fourth Partner	Tata Motors
4. Blu Smart Mobility-Gensol	Okaya Power	Tata Motors



5. Ola electric Mobility	BYPL/BRPL/IOCL	LG Chem (South Korea)/RIL
6. Euler Motors	LetsTransport	Self
7. Mahindra & Mahindra	Looking for partner	Tata green

Map EV ecosystem in China with India

The growth of the electric vehicle (EV) ecosystem in China has been substantial in recent years, driven by various factors including:

1. Government support: The Chinese government has been supportive of the EV ecosystem's growth, enacting various policies and subsidies to encourage the production and sale of EVs. This has contributed to the development of a favorable environment for the industry's growth.
2. Growing market demand: Concerns about air pollution and a desire for more environmentally friendly transportation options have led to an increase in demand for EVs in China. This has aided growth in the EV ecosystem, as more consumers prefer EVs to conventional vehicles.
3. Technological advancements: China has been at the forefront of technological advancements in the EV ecosystem, with local companies heavily investing in R&D to create more advanced and cost-effective EVs. This has contributed to the Chinese EV market's increased competitiveness.
4. Local dominance: The majority of the leading players in the Chinese EV ecosystem are local companies, which have a significant advantage in terms of market knowledge, supply chain, and distribution network. This has allowed them to maintain their market dominance and lead over international competitors.

Overall, the EV ecosystem in China has grown significantly in recent years, owing to government support, rising market demand, technological advancements, and the dominance of domestic players. With the continued growth of the industry, the EV ecosystem in China is expected to expand in the future.

The Belt and Road Initiative (BRI) is helping China in its dominance in the electric vehicle (EV) market in several ways:



1. Infrastructure development: The BRI aims to build infrastructure and transportation links throughout Asia, Europe, and Africa. This includes the creation of EV charging infrastructure, which will aid in the adoption of EVs in countries along the BRI route.
2. Market expansion: The BRI allows Chinese companies to expand into new markets, including those along the BRI route. This broadens their global reach, which can be advantageous for companies looking to sell EVs in these markets.
3. Technological transfer: The BRI allows Chinese companies to transfer their EV industry technology and knowledge to other countries. This can help to boost local players' competitiveness in these markets and support the growth of the EV industry in these countries.
4. Cross-border investment: The BRI promotes cross-border investment and trade, which can be advantageous for businesses looking to expand into new markets. This includes EV manufacturers, who can use the BRI to expand their operations and increase their market share in other countries.

Overall, the Belt and Road Initiative is assisting China's dominance in the EV market by facilitating infrastructure development, market expansion, technological transfer, and cross-border investment. With the continued expansion of the BRI, China is expected to strengthen its position in the global EV market.

China is currently ahead of India in the electric vehicle (EV) segment. With a large number of local manufacturers, suppliers, and service providers, China has a well-established EV ecosystem. The government has also encouraged the industry's growth through various policies and subsidies aimed at encouraging the production and sale of EVs.

On the other hand, while India has shown promise in the EV segment, the industry is still in its infancy. A number of initiatives have been launched by Indian Govt. to encourage the use of EVs, including tax breaks, subsidies, and exemptions. However, the industry continues to face a number of challenges, including a lack of charging infrastructure, a lack of consumer awareness, and high upfront costs for consumers.

Overall, while India has shown promise in the EV segment, it is still lagging behind China in terms of industry development. However, with continued government support and industry growth, India is expected to close the gap with China and become a major player in the global EV market in the future.

It is difficult to predict the exact trends for the next five years in the electric vehicle (EV) segment in India and China, but it is likely that the following trends will emerge:



1. Government support: Both India and China are likely to continue to provide subsidies, tax breaks, and other incentives to the EV industry in order to encourage the production and sale of EVs.
2. Infrastructure development: To support the growth of the EV industry, there will most likely be increased investment in charging infrastructure in both India and China. This will include the establishment of fast-charging networks and charging stations in urban and rural areas.
3. Market expansion: The EV market is expected to expand further in both India and China, driven by rising demand for environmentally friendly transportation options and falling EV prices.
4. Technological advancements: Both India and China are expected to continue investing in R&D to develop more advanced and cost-effective EVs. This will almost certainly result in the introduction of new EV models as well as improvements to existing models.
5. Dominance of local players: Given their knowledge of the local market, supply chain, and distribution network, it is likely that local companies in both India and China will continue to dominate the EV market.

Overall, trends in the EV segment in India and China over the next five years are likely to include continued government support, infrastructure development, market growth, technological advancements, and the dominance of local players. With continued industry growth, both India and China are expected to become major players in the global EV market.

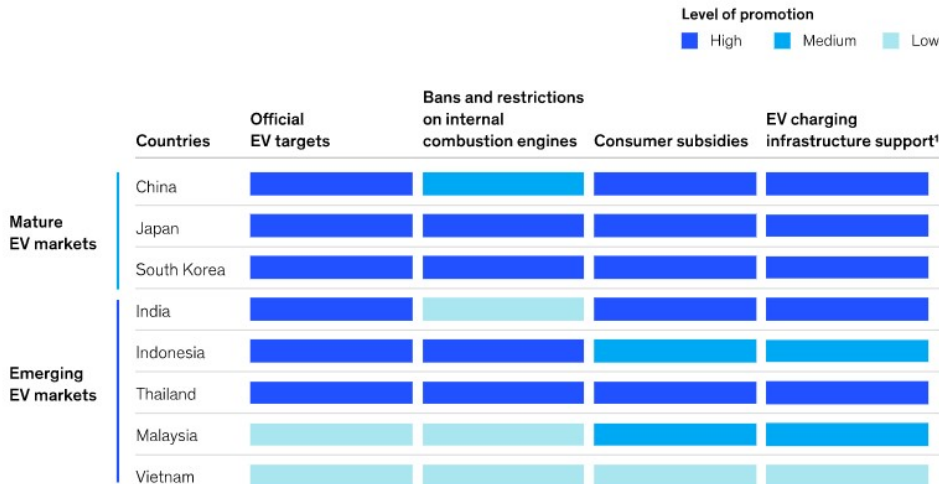
Business Perspective of Chinese EV Ecosystem

In terms of volume, China will overtake all other markets for EVs. If things continue as they are, China's adoption rate for EVs will reach 60% by 2030, and the country will account for more than 40% of all new EV sales worldwide.

The manufacture of E4Ws will quickly increase in rising Asia. There are already significant regional auto manufacturing centres in Thailand and Indonesia. With a combined growth rate of 45 percent, E4W production will scale up quickly from low levels to a sizeable share in these markets. By 2030, emerging Asia as a whole might manufacture more than

two million E4W devices yearly.

Asia's governments vary in their degree of promoting transport electrification.



¹Includes subsidies and funding for establishing EV charging network or targeted number of charging stations nationwide.
Source: Government websites as of May 2022; McKinsey analysis

Source: [McKinsey](https://www.mckinsey.com/industries/automotive/our-insights/ev-promotion-policies-in-china)

China's major cities have implemented a broad array of EV promotion policies

City	Car plate restrictions and ZEV direct access	Traffic restrictions and ZEV waivers	Lower cost or free parking	Subsidies for the use of charging infrastructure	Direct ZEV purchase subsidies	Public bus fleet electrification
Shanghai	✓	✓		✓ 2020		✓ 2025
Beijing	✓	✓				✓ 2020*
Chengdu		✓	First two hours			✓ **
Guangzhou	✓		First hour		✓ 2020/21	✓ 2020
Zhengzhou			50% off	✓ 2020		
Chongqing		✓	100% off	✓	✓ 2020	
Shenzhen	✓		First two hours		✓ 2020/21	
Suzhou			First hour			✓ 2020*
Hangzhou	✓	✓				✓ 2022
Dongguan						✓ 2020
Xi'an		✓	First two hours			✓ 2019
Wuhan		✓	First hour and then 50% off			
Tianjin	✓	✓		✓ 2020		✓ 2020*
Changsha						✓ 2020
Foshan						✓ 2019
Ningbo						✓ 2022
Nanjing			First hour			✓ 2021
Kunming			First two hours			✓ **
Jinan		✓	First two hours and then 50% off (BEV)	✓ 2020/21		✓ **
Shijiazhuang		✓			✓ Dec 2020	✓ 2020*

* Indicates the full fleet electrification target applies to the city's urban area. ** Indicates that the electrification requirement applies only to new or replacement vehicles for use as ZEV + zero-emissions vehicle. All restrictions refer to privately owned. L50% Various other restrictions apply to commercial vehicles. The cities are ranked by size of the car fleet in 2019. For the categories subsidies for the use of charging infrastructure and direct ZEV purchase subsidies the numbers indicate the years for which the policy is active. For the category public bus fleet electrification, the numbers specify the year by which the total stock is expected to be electrified. Sources: fleet list of cities in the Appendix chapter.

Source: [iea.org](https://www.iea.org)



Throttle in China's EV Market

The market for electric cars (EVs) in China is rebounding significantly after a decline in sales in 2019 and the effects of the pandemic in early 2020.

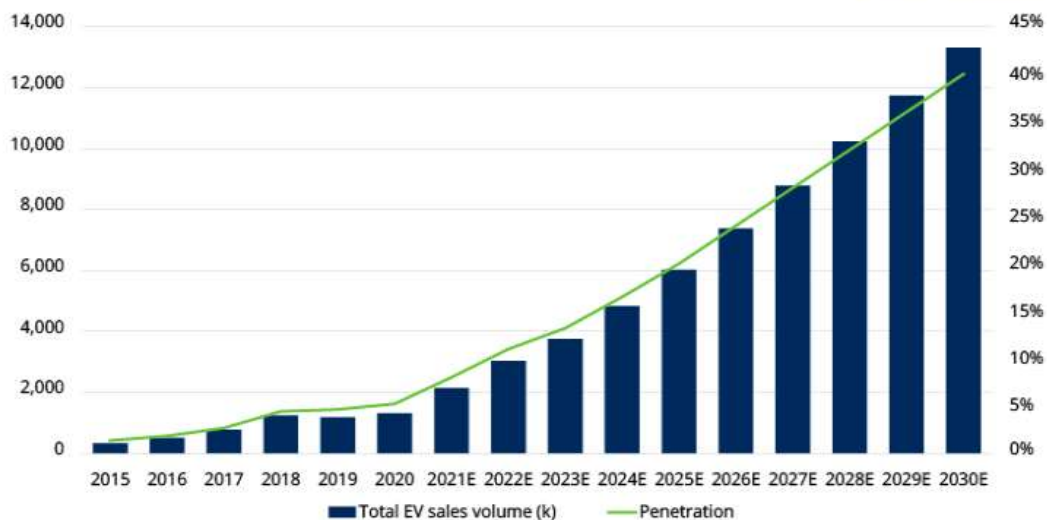
The combination of more alluring and cost-effective models is one of the causes causing this acceleration in sales. Additionally, recent government orders have strongly encouraged China's auto industry to transition to electrification.

How policy is helping to pave the way

President Xi Jinping highlighted the direction of travel in September at the United Nations when he vowed to reduce China's carbon dioxide emissions to almost zero by 2060. One of the crucial businesses that will assist the nation meet its climate goals is low-emission transportation, particularly electric vehicles (EVs).

EV sales and penetration in China, 2015-2030E

Schroders



Source: China Association of Automobile Manufacturers, Schroders estimates, as at 31 December 2020. 600615.

What other factors are fueling the rise in EVs?

Three other trends are boosting the appeal of EVs in China in addition to significant government policy backing.

1. EVs are becoming more affordable and have a longer range.

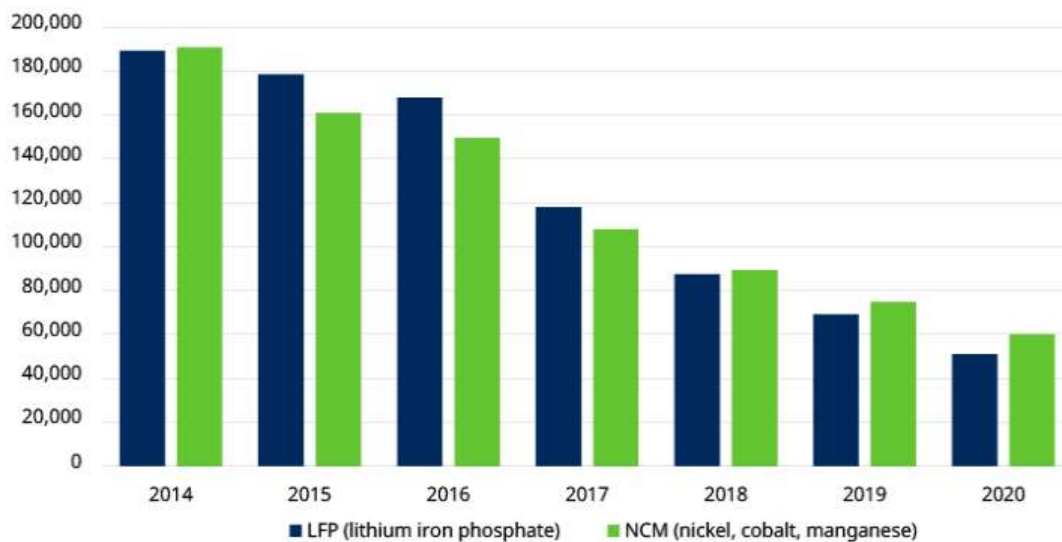
The three primary issues that Chinese consumers have with EVs are their expensive pricing, their short driving range, and the lack of charging stations.



The sudden decline in EV sales in the middle of 2019 when the government reduced price assistance levels is evidence that price sensitivity is still high. Up to June 2019, incentives for a car costing RMB250,000 (US\$38,000) might go as high as RMB50,000 (US\$7,600). For 2020–2022, price support will now be limited to RMB9–22,000 and eliminated in 2023. Because battery technology is advancing and prices are decreasing, there is less need for subsidies, hence the government is reducing price assistance.

Battery costs for EV with 70kwh battery, Rmb

Schroders



Source: GG Lithium Battery, BYD, Schroders estimates, as at 31 December 2020. 600615.

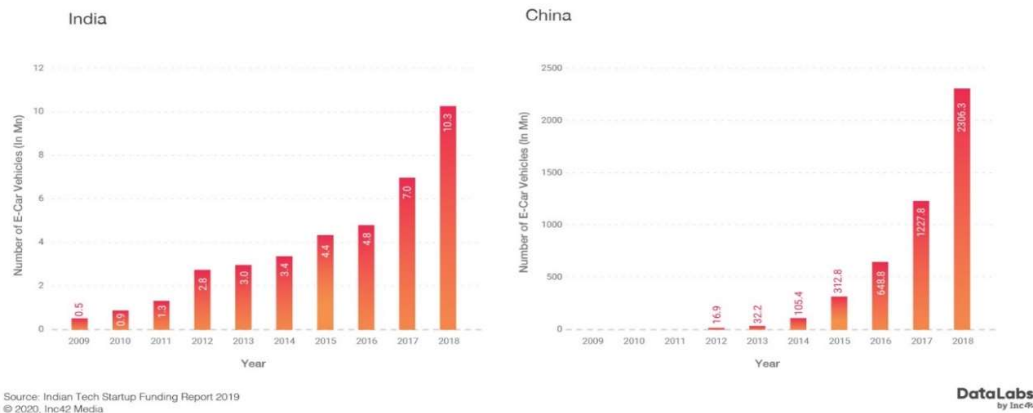
2. The introduction of new models has changed the game. Traditional automakers are also releasing new EV models, creating brand competition and providing customers more options.

3. Vehicle smartization: Chinese customers have quite different opinions about EVs than do Europeans, who are more concerned with how environmentally good they are. The smart technology, or "vehicle smartisation," that EVs offer, has a greater impact on Chinese consumers. And once the predicted price parity with conventional automobiles is reached within the next five years, this trend might firmly swing the market in favour of EVs.



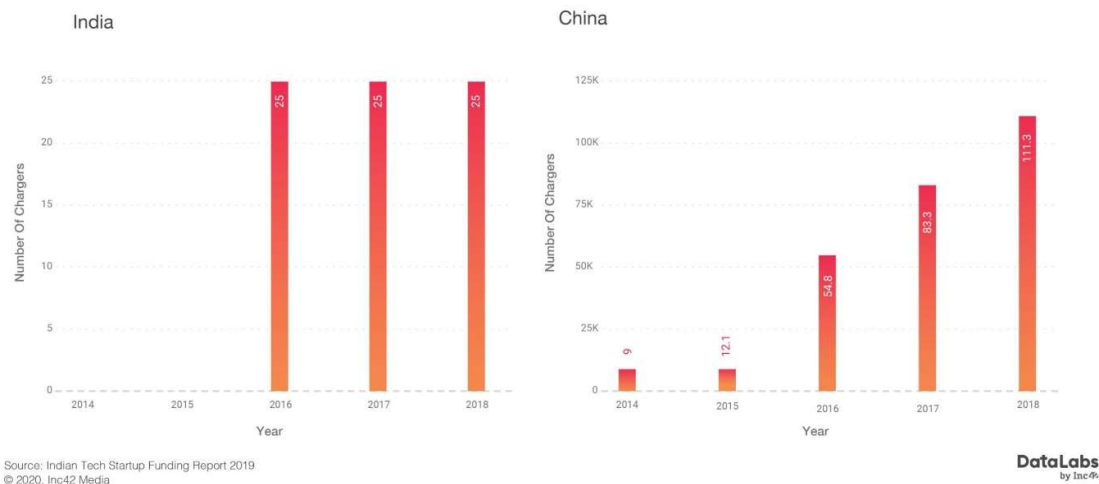
India Vs China EV Market

The Four-Wheeler Story



Source: [Inc42.com](https://inc42.com)

Publicly Accessible Fast Chargers



India vs. China EV Pricing Barriers

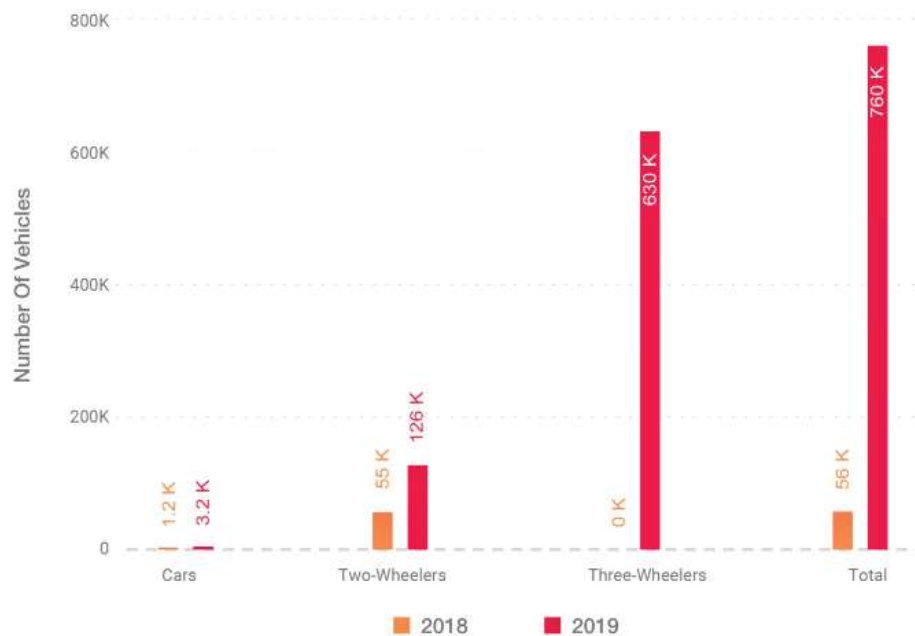
Chinese manufacturers are able to produce EVs at a lower cost than those of ICE vehicles and even other national markets because to government subsidies and large-scale economies of scale.

The price of the battery for electric vehicles increases in India. Nickel-metal hydride (NiMH) and lithium-ion (LiON), which are mostly imported, are the two battery materials that are being used the most. The high cost of EV manufacturing is caused by a number



of elements including demand-supply mismatches and unprofitably small volumes. The increase in units sold in 2019 compared to 2018 shows that the Indian customer is becoming more open to the idea of an electric vehicle. According to the Society of Manufacturers of Electric Vehicles, the number of two-wheeler electric vehicle sales increased by 130% to 1,26,000 units. Electric three-wheelers sold 6,30,000 units, while sales of four-wheelers increased by 200% to 3600 units.

EV Sales In India





Chapter 5: Recommendations OR Managerial Implications

Proposed Business Model Canvas for iRasus

Partners	Activities	Value Proposition	Customer Relationships	Customer Segments
<ul style="list-style-type: none"> Government EV manufactures Charging Infrastructure Provider EV fleet operators EV dealers Power Suppliers Sensor Suppliers Data Analysis Team Insurance & Loan Company Cloud Partners Spare Parts Supplier 	<ul style="list-style-type: none"> Software/website development Infra. Maintenance Data Analysis and report generation Reminder & Service On-boarding 3rd Party Vendor Management 	<ul style="list-style-type: none"> Chatbot Assistance Biometric Security Rent a EV Nearest Dealer Locator 3D Virtual Model Check Check Old vehicle health & Documents Find Charging Station, other 3rd party services & Book Locate your EV Check EV health Get Timely Reminder Secure your EV/SOS Get Monthly Report 	<ul style="list-style-type: none"> Customer Experience Brand Reputation Low Cost Charging & Spare parts Network Timely Report Insurance Network 	<ul style="list-style-type: none"> Green community EV Community EV charging station searchers EV Renters Consumers who want to know EV health Consumers who wants to buy used EV Customers that want to purchase EV related third-party services Consumers who desire timely reminders
Cost Structure	Resources	Revenue Streams	Channels	
<ul style="list-style-type: none"> App & Website Development & Maintenance 3rd Party Payment Cloud Service & Database Maintenance Taxes & Others 	<ul style="list-style-type: none"> Brand Value EV vehicles Spare Parts & Insurance Mobile Application Database Automation Battery Technology 	<ul style="list-style-type: none"> Subscription Based Model Service Based Income In-app Advertisement EMI based income 3rd Party Commission 	<ul style="list-style-type: none"> Mobile Application Dealers Partner Channels Integrated website & mobile application 3rd Party Service Providers 	

Based on the Business Model Canvas for iRasus Technologies in the EV battery sector in India, here are some proposed strategies that the company can focus on to enhance their business operations and gain benefits in the market:

Activities:

iRasus can focus on enhancing their software and website development activities to improve the user interface and user experience of their platform. By developing a user-friendly platform, iRasus can attract more customers and retain them. Additionally, the company can consider expanding their data analysis and report generation services to provide more in-depth insights and recommendations for customers.

iRasus can also focus on enhancing their vendor management services to provide



customers with a wider range of high-quality and reliable EV-related products and services. This will help to build trust and credibility with customers, which is crucial for long-term success.

Value Proposition:

To further enhance their value proposition, iRasus can focus on introducing more innovative and customer-centric features. For example, the company can consider integrating a feature that allows customers to book EV-related third-party services directly from the platform. This will provide customers with a seamless and efficient way to access additional services and will help iRasus to generate more revenue.

iRasus can also focus on developing a feature that provides customers with personalized recommendations based on their EV usage patterns. This will help customers optimize their EV usage and will differentiate iRasus from its competitors.

Customer Relationships:

To enhance their customer relationships, iRasus can focus on providing more personalized and tailored services. For example, the company can consider offering customized charging plans that are specific to each customer's EV usage patterns. This will provide customers with a more affordable and efficient way to charge their EVs and will help to build loyalty and retention.

iRasus can also focus on providing a seamless and hassle-free customer experience. For example, the company can consider introducing a feature that allows customers to schedule servicing and maintenance activities directly from the platform. This will provide customers with a convenient and efficient way to maintain their EVs and will enhance their overall experience.



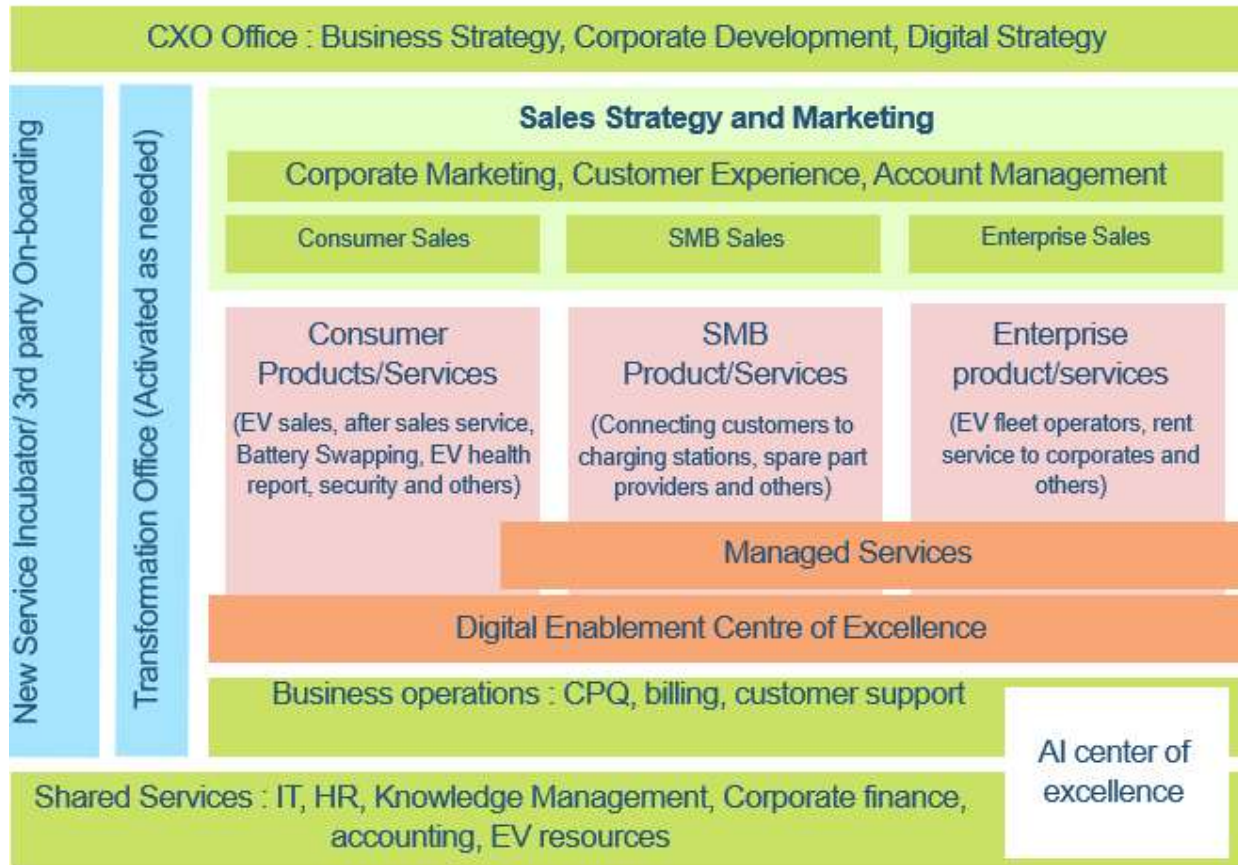
Customer Segments:

To attract more customers and expand their customer segments, iRasus can focus on developing partnerships with other players in the EV industry. For example, the company can partner with EV manufacturers to provide customers with exclusive discounts and offers on EV purchases. This will help to attract more customers and differentiate iRasus from its competitors.

iRasus can also focus on developing customized solutions for specific customer segments. For example, the company can consider developing a feature specifically for fleet managers, which allows them to manage multiple EVs from a single platform. This will provide fleet managers with a more efficient and effective way to manage their EVs and will differentiate iRasus from its competitors.

In conclusion, by focusing on these strategies, iRasus Technologies can enhance their business operations and gain benefits in the market. These strategies will help iRasus to differentiate from its competitors, attract more customers, and enhance customer loyalty and retention.

Proposed Operating Model for iRasus



iRasus Technologies, operating in the EV batteries sector in India, can focus on the following strategies based on the proposed operating model to enhance their business operating model and gain a competitive edge in the market:

1. **Consumer Products/Services:** iRasus can expand their product/service offerings to include EV sales, after-sales services, battery swapping, EV health reports, security, and other related products/services. By doing so, they can cater to the needs of individual customers and increase their revenue streams. Moreover, as the government is incentivizing the shift to EVs, there is a significant potential for growth in this segment.
2. **SMB Product/Services:** To cater to small and medium businesses, iRasus can offer solutions that connect customers to charging stations, spare part providers, and



other relevant service providers. By doing so, they can offer a complete EV ecosystem and enable businesses to transition to electric mobility more efficiently. This can help iRasus expand their customer base and increase their revenue.

3. **Enterprise product/services:** iRasus can offer products/services targeted towards EV fleet operators and provide rent services to corporates. This segment is expected to grow rapidly as companies are increasingly shifting towards sustainable practices. By offering EV fleet solutions and rental services, iRasus can tap into this market and provide a one-stop solution to corporates.
4. **Digital Enablement Centre of Excellence:** To stay ahead of the competition, iRasus can establish a Digital Enablement Center of Excellence to drive innovation and digital transformation. By doing so, they can stay on top of the latest technological developments and leverage them to enhance their business operations.
5. **Business operations:** iRasus can optimize their business operations by implementing a Configure, Price, Quote (CPQ) system, streamlining billing processes, and providing excellent customer support. These steps can help reduce operational costs, improve efficiency, and enhance customer satisfaction.
6. **Shared Services (AI Center of Excellence):** By establishing an AI Center of Excellence, iRasus can leverage AI to enhance their operations in areas such as IT, HR, Knowledge Management, Corporate finance, accounting, and EV resources. AI can help automate several processes, improve decision-making, and provide a competitive edge.

Proposed Revenue Model & Expansion Plan for iRasus



REVENUE MODEL

Customer Type	Type of Service	Payment Type
New Customers	Service Based	Direct Digital Transfer
Periodic Service Customers	Subscription based for those who periodically avail service	Direct Digital Transfer or Recurrent Charge from Bank
Existing Product Customers	Instalment based pricing will be charged	Easy Monthly Instalment automatically charged from bank
3rd Party Vendors	Commision Model	Retained Payment as per platform service contract
Advertisers	Pay to Display Model	Prescheduled Direct Payment

EXPANSION PLAN

YEAR 1,2	YEAR 3	YEAR 4	YEAR 5,6	YEAR 7
Awareness	Standardized	Proactive	Service Aligned	Optimized
Gap Analysis	Admin Task Automation	Process Automation	Cloud Ready	Strategic broker of service
Tools define process	Reporting Automation	Automate app release	Close loop development	Optimized for scale
Adaptability	Change Management	Compliance Remediation	Utilize Less Maintanance	Continuous governance

iRasus Technologies can focus on the following revenue models to maximize their profits:

1. **New Customers-Service Based-Direct Digital Transfer:** This model involves charging new customers for the services provided by iRasus Technologies, such as EV sales, after-sales service, battery swapping, EV health reports, and security services. Customers can make direct digital transfers for the services availed. This model will be useful for iRasus as it can generate revenue from new customers without relying on any other source.
2. **Periodic Service Customers:** Subscription based for those who periodically avail service-Direct Digital Transfer or Recurrent Charge from Bank: This model involves offering periodic services to customers who periodically avail of the services provided by iRasus Technologies. The company can offer subscription-based plans to these customers, and they can make direct digital transfers or allow iRasus to charge them recurrently from their bank accounts. This model will ensure a steady stream of revenue for iRasus and create loyal customers who will continue to avail of their services periodically.
3. **Existing Product Customers:** Instalment based pricing will be charged-Easy Monthly



Installment automatically charged from bank: This model involves charging existing product customers for the products they have already purchased from iRasus Technologies, such as EVs. The company can offer installment-based pricing plans to these customers, and the payments can be automatically charged from their bank accounts on a monthly basis. This model will be beneficial for iRasus as it can generate additional revenue from its existing customer base.

4. **3rd Party Vendors:** Commission Model-Retained Payment as per platform service contract: This model involves charging third-party vendors who use the iRasus platform to offer their services to customers. iRasus can charge a commission on the services provided by the vendors, and the payment can be retained as per the platform service contract. This model will be useful for iRasus as it can generate revenue from the third-party vendors without investing in their services.
5. **Advertisers:** Pay to Display Model-Prescheduled Direct Payment: This model involves charging advertisers for displaying their ads on the iRasus platform. iRasus can charge advertisers on a pay-to-display model, and the payment can be prescheduled for direct payment. This model will be beneficial for iRasus as it can generate revenue from advertisers without affecting the user experience of the platform.

Overall, iRasus Technologies can opt for a combination of these revenue models to diversify their revenue streams and maximize their profits. By offering a range of products and services to various customer segments, iRasus can generate consistent revenue and build a sustainable business model in the EV battery sector in India.

Expansion Plan



iRasus Technologies, being a company in the EV batteries sector, has a great potential for growth and expansion. Here are the proposed activities that the company can focus on for their expansion plan:

Year 1 & Year 2 (Awareness): In the initial years, iRasus can focus on creating awareness about their products and services. The company can conduct a gap analysis to identify areas of improvement and define tools to streamline their processes. They can also focus on adaptability, making sure that their products and services are flexible and can be tailored to meet the needs of their customers.

Year 3 (Standardized): In the third year, iRasus can work towards standardizing their processes. They can automate administrative tasks and reporting processes to increase efficiency and reduce errors. Change management can also be a focus area, ensuring that any changes made to the company's products and services are well communicated and well-received by customers.

Year 4 (Proactive): In the fourth year, iRasus can focus on process automation to further increase efficiency and reduce errors. The company can also automate app releases to ensure timely updates and compliance with industry standards. Compliance remediation can also be a focus area, making sure that the company is adhering to all regulations and standards.

Year 5 & Year 6 (Service Aligned): In the fifth and sixth years, iRasus can work towards making their products and services cloud-ready. The company can also focus on close-loop development, where customer feedback is taken into consideration in the development process. The goal is to create products and services that require less maintenance and are aligned with customer needs.

Year 7 (Optimized): In the final year, iRasus can focus on becoming a strategic broker of services. The company can optimize their products and services for scale, ensuring that



they can meet the needs of a growing customer base. Continuous governance can also be a focus area, making sure that the company's products and services are always up to date and compliant with industry standards.

By following these proposed activities, iRasus Technologies can benefit by creating a more streamlined and efficient organization, developing products and services that are aligned with customer needs, and becoming a trusted provider of EV battery-related products and services in India.

Proposed Governance Model for iRasus Technologies

GOVERNANCE MODEL

Roles	Information and EV Governance Leader				
	CSED, Digital Governance Committees, FAME-II, PLI Scheme, Data Framework				
	Business/ Organization	Legal/ Compliance	Information management	Privacy/ Security	Electronic Vehicle Law
Structures	Infrastructure & Technology		Information Architecture, Taxonomy & Metadata		
Information Lifecycle	Create/ Capture	Access			Dispose/ Archive
		Collaborate/Use	Retain/Store	Hold/Discover	
Technology Excecution	Applications				
	Hardware/Networks/SLAs/Licensing				
Policies & Procedures	Metrics	Processes	Roles	Standards	Performance
	Accountability				
	Decision Rights				

iRasus Technologies can benefit from implementing a robust governance model for managing its information and EV systems. The following activities can be considered to



achieve effective governance:

Information and EV Governance Leader: iRasus can appoint a dedicated governance leader or team responsible for managing its information and EV systems. This team can work closely with the Corporate Social and Environmental Department (CSED) and Digital Governance Committees to ensure compliance with regulations and guidelines such as the FAME-II and PLI Scheme. Additionally, developing a data framework can help the company to manage data privacy, security, quality, and usage.

Structures: iRasus can establish appropriate structures such as infrastructure and technology to manage its information and EV systems. Information architecture, taxonomy, and metadata can be implemented to ensure effective data management and governance. Having proper infrastructure and technology will help the company to ensure data availability, accessibility, and integrity.

Information Lifecycle: iRasus can establish clear policies and procedures to manage the information lifecycle from creation/capture to disposal/archive and hold/discovery. This will ensure that data is handled responsibly and ethically, and that proper retention and disposal policies are followed.

Technology Execution: Hardware, networks, service-level agreements (SLAs), and licensing are critical components for technology execution. iRasus can work with vendors to ensure that these components are properly managed and maintained to ensure availability, performance, and security.

Policies & Procedures: Having well-defined policies and procedures is critical for ensuring effective governance. iRasus can establish clear metrics, accountability,



processes, roles, standards, and decision rights to manage its information and EV systems. This will help to ensure that stakeholders understand their roles and responsibilities and that governance activities are effectively managed.

By implementing a robust governance model, iRasus can benefit in several ways. Firstly, effective governance can help to ensure that the company meets regulatory and compliance requirements. Secondly, it can help to ensure data quality, availability, and security, which can help the company to make informed decisions. Thirdly, effective governance can help to minimize risks associated with information and EV systems, which can result in cost savings and increased efficiency. Finally, effective governance can help to improve stakeholder confidence in the company's operations and management, which can enhance the company's reputation and customer base.

Conclusion

In conclusion, implementing a governance model for managing information and EV systems can bring significant benefits to iRasus Technologies. By focusing on areas such as governance leadership, infrastructure, information lifecycle, technology execution, policies, and procedures, the company can ensure that its information and EV systems are managed effectively and ethically. This will help to ensure compliance with regulations, improve decision-making, minimize risks, and enhance stakeholder confidence.

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Plagiarism Report



Plagiarism Report



Executive Summary

This report collates all primary and secondary research done keeping in mind the end goal of iRasus –

- To understand the problems faced by the stakeholders in the EV battery value chain
- Create metrics to quantify those problems
- Create framework to measure
- Integrate the findings in a cloud-based platform for EV battery health analysis and service

Current status of EV market in India have been thoroughly understood. Data about current battery pack manufacturers in India, EV fleet operators and the changing technology trend has been studied. The standing of Indian EV ecosystem as compared to that of China has been mapped to understand the possible future of Indian EV market in coming years.

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