Nirmaan Pitch Deck

SWAPVERSE

Nirmaan Pre-Incubator Application
Summer Cohort’25

About You/Your Team

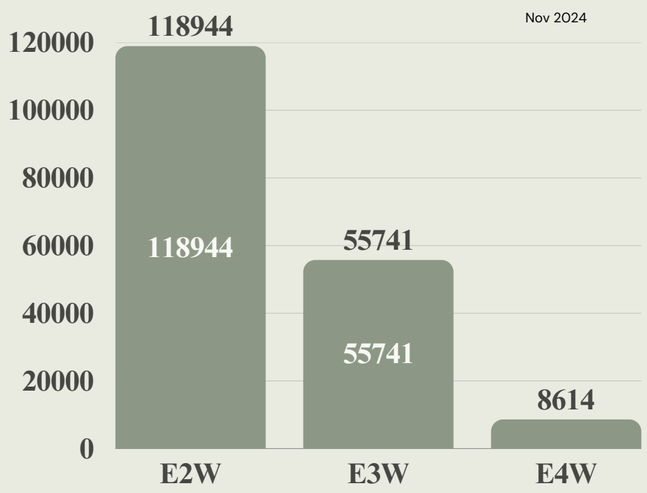
Photo	Name	Department and College	Year	Skillsets I Bring	Passion/Interest	Role in Team
	Aditya Tamras	Biological Engineering (IIT Madras)	3rd Year	Tech Strategy, Full Stack Development	Tech Innovation	Co-Founder
	Aditya Raj	Biological Engineering (IIT Madras)	3rd Year	Market Analysis, Stakeholder Management	Product Management	Co-Founder
	Pranav Mane	Biological Engineering (IIT Madras)	3rd Year	Product Roadmap, Tech Innovation	Strategic Innovation	Co-Founder

INDUSTRY	Auto Mobile Industry (EV Industry)
SOLUTION TYPE	Battery as a Service (BaaS) & Software Solution
TECHONOLOGY BEING USED	Battery Swapping Technology, IoT and Smart Battery Management, Centralized Mobile application and Digital Battery health Tracking and Digital Payment
STAGE OF VENTURE	Idea Phase and Pre-Revenue Stage (We Got Scholarship and Idea Validation from Hyundai through there Hope Scholarships)
INTELLECTUAL PROPERTY RIGHTS	SwapVerse.ev will protect its AI-driven battery-swapping optimization as a **Trade Secret**, using Deep Q-Learning for dynamic station placement, K-Means Clustering & DBSCAN for real-time battery matching, Random Forest & XGBoost for EV and battery identification, and Dijkstra's Algorithm for fastest route selection to ensure seamless swaps.

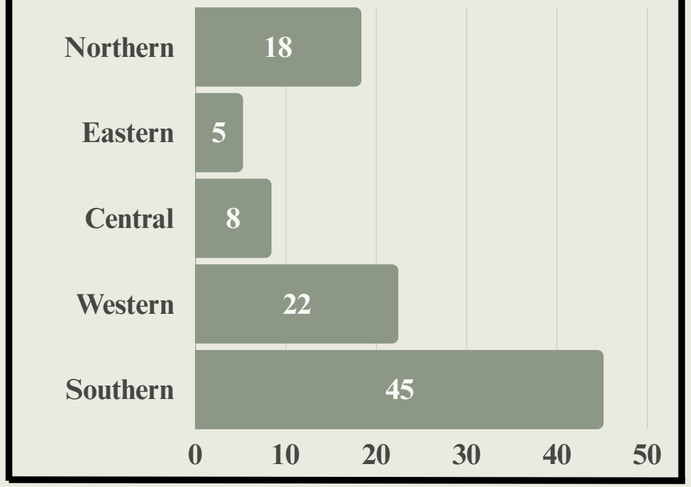
PROBLEM WE SEE	SOLUTION WE GIVE
• Lack of Fast and Convenient Charging Infrastructure	• 5-Minute Battery Swapping Stations at Local Mechanic Shops instead of standalone hubs. • Mobile App Integration for Station Availability in real time.
• High Initial Cost of EVs (Battery Cost Barrier)	• Battery-as-a-Service (BaaS) Model – Users rent batteries on a subscription basis instead of buying. • AI-Powered Dynamic Pricing (XGBoost) for Usage-Based Battery Rentals
• Compatibility Issues Between EVs & Battery Stations	• AI-Based Battery Recognition (Random Forest & XGBoost) to Detect EV Model & Recommend Compatible Battery Stations.
• Range Anxiety & Uncertainty in Battery Availability	• Live Battery Availability Map via API Integration with All Swapping Stations. • AI-Driven Predictive Battery Stocking (Deep Q-Learning) to Ensure No Stockouts at Any Station
• Inefficient Station Placement & Underutilization	• Deep Q-Learning for AI-Optimized Station Placement in High-Demand Areas. • Real-Time Heatmap Analysis of EV Traffic to Identify the Best Station Locations
• Data Silos Among Competing Swapping Networks	• Universal Swapping App Aggregator (Google Maps for EV Swapping) – Shows all competitor stations (SUN Mobility, Bounce Infinity, etc.) in one app.
• Sustainability & Second-Life Battery Management	• Battery Repurposing for Solar Energy Storage & Backup Power. • Machine Learning-Based Battery Health Prediction for Early Recycling (Random Forest)

MARKET AND SEGMENT ANALYSIS

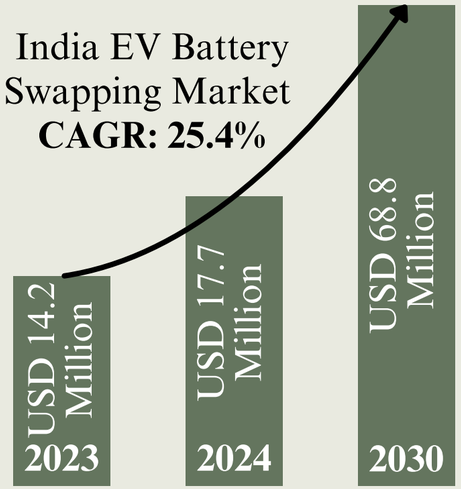
E2Ws Dominates the EV Sales



South India drives 45% EV sales

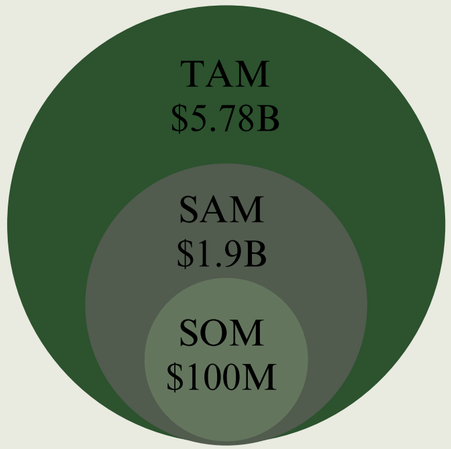


Growth Forecast for Battery Swapping Industry

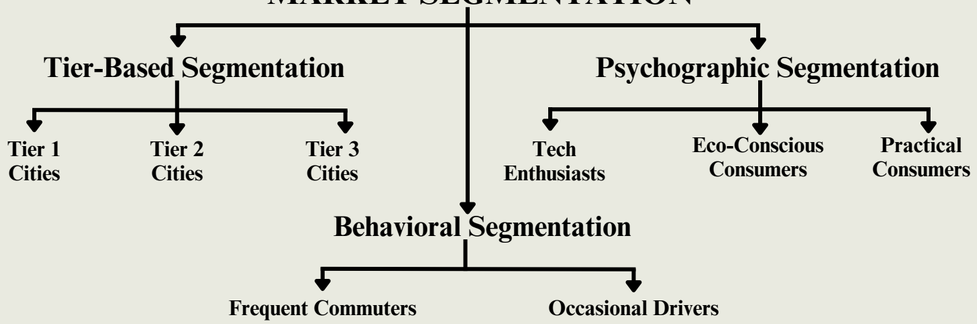


TAM, SAM, SOM for EV Charging Industry

*By 2030



MARKET SEGMENTATION



Surat (20,150) and Jaipur (18,600) led sales, followed by Ahmedabad (17,300), Mumbai (13,800), Chennai (13,710), and Nagpur (13,730). **The Penetrations of EVs is Pretty solid in some of the Tier 2 cities in comparison with the Tier 1 Cities.**

By 2030, the **government aims** for **30%** penetration of EVs in cars, **70%** penetration of EVs in commercial vehicles, and **80%** penetration of EVs in two- and three-wheelers.

E2Ws Leads 55% and E3Ws Leads 35% of EV Sales

- In India, the battery of an electric three-wheeler (E3W) makes up about 25-28% of the total vehicle cost. Most E3Ws use Sealed Lead Acid (SLA) batteries because they are cheaper upfront compared to lithium-ion (Li-ion) batteries. However, Li-ion batteries are better because they store more energy and provide more power while being lighter.
- A lithium-ion battery in an electric two-wheeler (E2W) can be fully charged (0-100%) about 3000 times before its efficiency drops by 40%. In comparison, a lead-acid battery lasts only about 1000 charge cycles and starts degrading significantly within 6-8 months. Also, swapping batteries instead of charging them directly can wear them out even faster.
- Electric buses follow fixed routes, so drivers prefer a subscription plan. E3Ws, with no fixed routes, prefer pay-per-use based on their electricity consumption.

POLICY & INVESTMENT SUPPORT

- The Indian government's FAME II (₹11,500 crore) and PLI Scheme for ACC (₹18,100 crore) boost Battery-as-a-Service (BaaS) by driving EV adoption and local battery manufacturing. FAME II offers subsidies up to ₹20,000/kWh, reducing EV costs and increasing battery demand. PLI Scheme aims to create 50 GWh of battery capacity, lowering costs and ensuring a stable supply.
- The Indian government's 2020 policy allows EV registration without pre-installed batteries, reducing upfront costs by 30-40% and boosting Battery-as-a-Service (BaaS) adoption. This enables battery leasing and swapping, making EVs more affordable and convenient. India's battery market, valued at $1 billion in 2022, is projected to reach $6 billion by 2030, driven by this policy
- Hyundai to invest $2.45B in Tamil Nadu for EVs, battery assembly, and 100 charging stations.

DEFINING THE TARGET MARKET

EV USERS FACING CHARGING CHALLENGES

INDIVIDUAL COMMUTERS

1. Who they are?
- Urban Residents who use E2Ws for daily Travel.

2. **Why they need Battery as a Service?**
- Long Charging Times (3-4 hrs) makes Traditional Charging Inconvenient.
- Many don't have charging setup, especially in apartments.

3. Market Size & Potential?
- Indian Electric two-wheeler market is growing annually at 25%.
- Over 1.5 Million Electric two-wheelers were sold in India in 2023 and this number is expected to double by 2025.

COMMERCIAL & FLEET OPERATORS

1. Who they are?
- Auto-rickshaw using E3Ws, Bike Taxi services like Rapido and Ola Bike.
- Delivery drivers working for Zomato, Swiggy, Amazon, Blinkit etc.

2. **Why they need Battery as a Service?**
- Time is Money - waiting hours to charge means lost income.
- Their Vehicles run 100+ km per day, requiring multiple charges.

3. Market Size & Potential?
- Electric three wheelers make up 55% of the battery swapping market.
- By 2030, 80% of India's E2Ws and E3Ws will rely on battery swapping.

BAAS PROVIDERS & EV MANUFACTURERS

BATTERY SWAPPING PROVIDERS

1. Who they are?
- Companies like Sun Mobility, Bounce Infinity that run Battery Stations.

2. **Why they need Battery as a SwapVerse.ev?**
- They operate disconnected, individual networks; SwapVerse.ev will unify all providers into one app, increasing user reach.
- AI-driven demand prediction ensures better station placement and higher utilization rates.

3. Market Size & Potential?
- India's battery-swapping market is growing at 25.4% CAGR and will reach $ 68.8 million by 2030.
- 50% reduction in operational costs by optimizing station locations and battery availability

EV MANUFACTURERS

1. Who they are?
- Companies like Ola Electric, Ather Energy, Hero Electric, and TVS that make EVs.

2. **Why they need Battery as a SwapVerse.ev?**
- They can integrate their vehicles with our app, offering users a seamless battery-swapping experience.

3. Market Size & Potential?
- India's EV market is expected to reach $206 billion by 2030

UNDERSTANDING THE USER

URBAN EV ENTHUSIASTS

30 years
Software Engineers
Lives in Bangalore (Tier 1)

NEEDS

1. Convenient and quick battery swapping to minimize downtime during long trips or daily commutes.
2. Reliable access to fully charged batteries at multiple locations to alleviate range anxiety.
3. Cost-effective alternative to owning and maintaining multiple batteries or waiting for long charging times.

PAIN POINTS

1. Long waiting hours at charging stations, causing frustration and inefficient use of time during busy schedules.
2. Limited driving range of current EV batteries, restricting travel plans and causing stress during longer journeys.
3. High upfront costs of EVs and batteries, making ownership and maintenance financially challenging for many.

JUGAAD DRIVERS

45 years
Auto Driver
Lives in Surat (Tier 2)

NEEDS

1. Rapid battery swapping to keep taxis on the road, maximizing revenue-generating hours and meeting customer demand.
2. Predictable battery availability across the city to ensure uninterrupted service and route planning.
3. Cost-efficient battery management solution to reduce operational expenses and increase profitability.

PAIN POINTS

1. Revenue loss due to extended charging times, reducing the number of trips and overall earnings per vehicle.
2. Difficulty in managing battery life and performance across the fleet, leading to inconsistent service quality.
3. Challenges in scaling EV adoption within the fleet due to infrastructure limitations and high battery replacement costs.

DELIVERY DYNAMOS

28 years
Gig Worker
Lives in Jaipur (Tier 2)

NEEDS

1. Ultra-fast battery swapping to maintain continuous operations and meet tight delivery schedules.
2. Wide network of swapping stations to support extensive delivery areas and optimize route efficiency.
3. Scalable battery solution to easily expand EV fleet without significant infrastructure investment.

PAIN POINTS

1. Delivery delays caused by unexpected battery depletion, leading to customer dissatisfaction and potential business loss.
2. Complexity in managing battery levels across a diverse and widely distributed delivery fleet.
3. Difficulty in maintaining consistent delivery speed & range across different urban environments , weather conditions.

COMPETITOR ANALYSIS

Sno.	Feature / Aspect of the Venture	Swap--Verse.ev	Smart Battery	Sun Mobility	Lithion Power	Esmito
1.	Battery swapping for 2-wheelers & 3-wheelers	✓	✓	✓	✓	✓
2.	Integration with local mechanic shops	✓	✗	✗	✗	✗
3.	Mobile app for service access	✓	✓	✓	✓	✓
4.	Integrated platform for EV users, battery providers, and swapping stations	✓	✓	✓	✗	✓
5.	AI-driven battery swapping optimization using Deep Q-Learning	✓	✗	✗	✗	✗
6.	Real-time battery matching using K-Means Clustering & DBSCAN	✓	✗	✗	✗	✗
7.	Fastest route selection using Dijkstra's Algorithm	✓	✗	✗	✗	✗
8.	Compatibility detection for EV and battery types	✓	✓	✓	✗	✓
9.	Subscription-based business model for B2B battery providers	✓	✓	✗	✗	✗
10.	Partnerships with EV OEMs	✗	✓	✓	✓	✓

UNIQUE SELLING POINT

What We Do the Best?

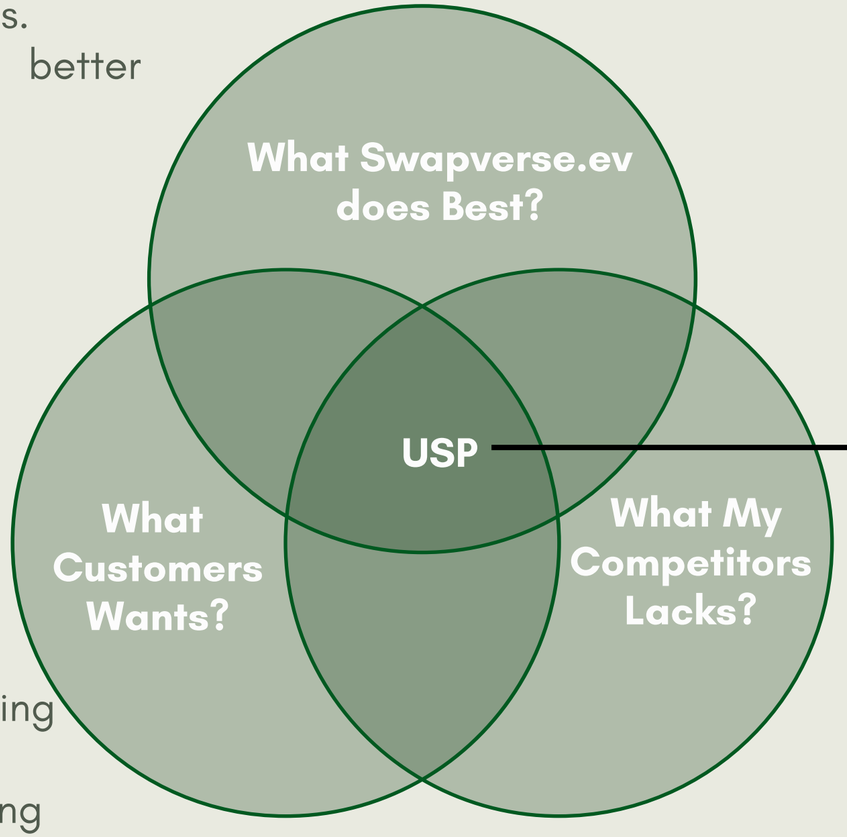
- AI-driven smart battery swapping system.
- Predictive analytics to avoid long wait times.
- Real-time battery health matching for better performance.

What Customer Desires?

- Fast & hassle-free swaps with minimal downtime.
- Guaranteed battery availability without guesswork.
- Cost-effective and optimized routes for efficiency.

What Competitors Lack?

- Lack of intelligent battery distribution, leading to empty stations.
- No predictive demand planning, causing long queues.
- Limited focus on AI-driven optimization for user experience.



- Smart Battery Swapping with AI (Deep Q-Learning)
- Smartest Swap Station Placement (Geospatial & Traffic Analysis)
- Super-Fast Battery Matching (K-Means Clustering & DBSCAN)
- Predicting Battery Demand Before It Happens (Random Forest & XGBoost)
- Always Find the Fastest Swap Station (Dijkstra's Algorithm)
- Making Every Battery Compatible (Smart Compatibility Detection)

EV SUBSCRIPTION COST ANALYSIS FOR E2WS, E3WS, AND E4WS

	Parameters	E2Ws	E3Ws	E4Ws
Petrol	Avg. Distance (Km)	1000	6000	2000
	Mileage for Petrol Vehicle (Kmpl)	50	28	20
	Cost Per Litre (Rupees)	100	100	100
	Cost Per Km (Rupees)	2	3.57	5
	Total Cost (for Petrol)	2000	~ 22,000	~ 10,000
Basic EV Subscription Costs	Coverup of Battery Cost	40,000	80,000	4,00,000
	Time Duration to cover the Battery Cost (month)	48	48	84
	Per Month Cost for Battery Payment	833	1,666	4,761
	Avg Distance Over a Full Charged Battery (km)	100	125	250
	Cost for Full Charge	25	60	250
	Cost per Swap	25+5=30	60+5=65	250+25=275
	No. of Free Swaps	5	30	4
	Free swaps travel (km)		3750	1000
	Total Cost for Free Swaps	150	1,950	1,100
	Per swap Commission to Infra (Mechanic)	20%	8.33%	10%
	Basic Subscription Costs	**999**	**3,499**	**5,999**
	Net Profit/Loss	17	-117	138
Extra Swap Costs	Cost per extra swaps	25+5+10=40	60+15+25=100	250+37.5+62.5=350
	Our Commission	25%	25%	25%
	Infra Provider Commission	12.50%	15%	15%
	Approx. No. of Extra Swaps	5	18	4
	Total Extra Swap Costs	200	1800	1400
Total Cost (Approx)	Total Cost for user (per Month)	1199	5,299	7,399
	Money Saved from Petrol	800	16,000	2,600
	Percentage Saved	40%	72%	26%

E2Ws

E2Ws: **₹1,199/month**, saving 40% (₹800) over petrol. Covers 3750 km with 5 free swaps. Best for daily commuters.

E3Ws

E3Ws: **₹5,299/month**, saving 72% (₹16,700). Covers 3750 km with 30 free swaps. Ideal for commercial use.

E4Ws

E4Ws: **₹7,399/month**, saving 26% (₹2,600). Covers 1000 km with 4 free swaps. Good for fleets and high-mileage users.

NEED OF NIRMAAN

WHAT WE ARE GOOD AT?

- Ideation & Innovation – We excel at coming up with creative and disruptive ideas that solve real-world problems. Our team thrives on brainstorming and turning fresh concepts into actionable solutions.
- Leadership & Team Management – We know how to build and manage a strong team, ensuring everyone is aligned with the vision while fostering a culture of collaboration and efficiency.
- Adaptive Learning & Growth Mindset – We are quick to learn, adapt, and improve. Whether it's market trends, technology shifts, or customer behavior, we stay ahead by continuously evolving.
- Revenue Model & Pricing Strategy – We understand how to structure our pricing and business model to ensure profitability and long-term sustainability.

WHAT DO WE NEED HELP WITH?

- Market Analysis & Research – We need expert guidance to understand industry trends, competitor landscapes, and potential gaps in the market to fine-tune our strategy.
- Market Entry Strategies – We need support in figuring out how to position our product effectively, identify the right audience, and craft a go-to-market plan that drives traction.
- Technical Mentorship – While we have strong technical expertise, we could benefit from mentorship from experienced professionals to refine our approach and solve complex technical challenges.
- Customer Acquisition & Growth – We need strategies and playbooks on how to attract, convert, and retain customers effectively. Scaling demand generation is crucial for our success.
- Business Networking & Strategic Partnerships – Access to potential partners, investors, and industry connections will help us grow faster and create a stronger presence in the market.
- Legal & Compliance Support – Understanding the regulatory framework, intellectual property rights, and compliance requirements specific to our industry will be valuable as we scale.

SEED FUND UTILIZATION

Sno.	Category	Budget	Justification
1.	Battery Health Prediction AI (ML)	30,000	More data for better performance
2.	Mechanic Optimization AI	10,000	AI-assisted mechanic network
3.	Demand Prediction Algorithm	20,000	AI for optimizing swapping locations
4.	Backend & Database	25,000	Stable app infrastructure
5.	AI Integration & Deployment	25,000	Seamless AI functioning
6.	Pilot Station Setup	20,000	Location setup, space rental
7.	Battery Procurement & Rental Model	30,000	Core consumable expense
8.	Consumables (Prototype Parts)	10,000	Parts for station & testing
9.	Trips for Startup Growth (Market Research)	20,000	Supplier meetings, market research
10.	Marketing & Early-User Acquisition	10,000	Focus on digital marketing
	Total	2,00,000	

AI-Driven Efficiency - ₹60,000 goes into developing AI for battery health, demand prediction, and mechanic optimization, making our system smarter and scalable.

Real-World Execution - ₹50,000 is dedicated to setting up the first swapping station, ensuring we move beyond just ideas to a functional prototype.

Sustainable Growth - ₹50,000 for app development & cloud infrastructure, ensuring smooth AI integration, scalability, and long-term usability.

Thank you.

SwapVerse.ev

Aditya Raj, Co-Founder
Aditya Tamras, Co-Founder
Pranav Mane, Co-Founder