

Advancing electrification of e-commerce deliveries in India

A Flipkart case study





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Foreword

The advent of e-commerce in India has been one of the most significant sectoral transitions in the past decade, and this growth is expected to continue rapidly. The sector holds promising opportunities for India as it is expected to contribute 3.5% of India's gross domestic product (GDP) by 2030, spur economic growth and create new jobs.¹

World Business Council for Sustainable Development's (WBCSD) Transport & Mobility Pathway aims to abate global transport emissions in line with a +1.5°C scenario by helping businesses achieve their net-zero carbon commitments and accelerating the adoption of zero-emission vehicles and technologies. We support companies in managing their sustainability transition and finding new revenue sources through circularity and data-driven mobility solutions.

Sustainability is the need of the hour and is a pressing priority for businesses, customers, investors and policymakers in India.² The growing shift from brick-and-mortar retail towards e-commerce with its massive delivery vehicle deployment calls for cleaner mobility pathways. These pathways should provide economical, efficient and convenient mobility services that are safe, reduce the

dependence on fuel and cause least environmental impressions and adverse impacts on human health.

The good news is that e-commerce companies are already leading the electric vehicle (EV) transition in India. These businesses now recognize EVs as a cost-improvement measure, in addition to helping run their operations sustainably, improve customer satisfaction and meet regulatory compliance.

Today, on a total cost of ownership (TCO) basis, light EVs (two-wheelers and three-wheelers) are already economically viable if the daily utilization of the vehicles is high. E-commerce fleets often have high daily vehicle utilization, making them ideal candidates for early EV adoption. Moreover, the economics of the EV model for commercial fleets is also improving quickly.

There is a strong consensus within various Indian ministries to prioritize e-commerce electrification in the EV adoption sequence. Many state governments are increasingly instituting policies to prioritize the electrification of e-commerce fleets and related charging infrastructure. This includes recently announced

schemes by the Delhi³ and Maharashtra⁴ governments mandating e-commerce companies to transition to EV fleets. A similar approach by other state governments and the central government can help set out a clear direction for e-commerce businesses to accelerate EV investments.

Flipkart, one of India's leading e-commerce marketplaces, is making conscious efforts towards building a sustainable, inclusive and equitable e-commerce ecosystem. The drive towards electric mobility is a significant sustainability initiative for Flipkart and a pioneering step for India. By committing to the Climate Group's EV100 commitment,⁵ Flipkart has reinforced that it has the willingness, ability and scale to guide India's transition to sustainable e-commerce deliveries.

This report and related work being carried out by both WBCSD and Flipkart is an important step forward in consolidating knowledge on the best ways for e-commerce companies to adopt and scale electric mobility today. We hope it will guide and inspire the widespread adoption of electrified e-commerce in India and encourage action in other countries.



Rajneesh Kumar
SVP & Chief Corporate
Affairs Officer, Flipkart



Thomas Deloison
Director, Mobility,
WBCSD

Executive summary

The past decade has seen unparalleled growth in e-commerce buying both in India and globally. The market in India has grown 35 times since 2011,¹ primarily fueled by the change in customer-buying behavior. The COVID-19 pandemic and its resultant restrictions have enhanced the digital shift in shopping behavior, further accelerating growth. The e-commerce market in India is expected to grow four times from USD \$84 billion in 2021 to USD \$350 billion by 2030.¹

Mobility is central to e-commerce business operations. To meet the growing demand, e-commerce companies in India will require to deploy over 160,000 new vehicles (of all sizes, ranges and payloads) in this decade.⁶ However, this rapid growth in e-commerce operations, powered primarily by fossil fuels, has vast implications for India's energy use, carbon emissions and air quality in cities. Urban freight and last-mile distribution constitutes approximately 65% of an e-commerce company's Scope 3 emissions.⁷

The electrification of fleets can weaken the positive correlation between the rapid growth of e-commerce and its adverse environmental impact. As per our analysis, a 100% adoption of EVs for e-commerce deliveries in India by 2030 could prevent 44% of the total CO₂ emissions caused by equivalent internal combustion engine (ICE) vehicle variants (see figure 2).⁶

The business case for electrifying e-commerce is progressing rapidly, ahead of several other use cases. In India, forward-looking e-commerce and traditional logistics companies have begun making commitments towards electric mobility. These include Flipkart, Myntra, IKEA, Zomato (100% EV transition targeted by 2030) and Amazon (10,000 EVs by 2030) who are taking this initial leap.

Characteristics like fixed pick-up points, consistency of kilometers travelled daily, and predictability of routes and energy demands support the case for e-commerce companies to transition to EV fleets.

Flipkart, India's homegrown e-commerce leader, is one of the first players to commit to transitioning to 100% EV fleets

by 2030, and it has signed up for the global EV100 initiative.⁵ Its journey towards electric mobility adoption started with a pilot in 2017 and now forms a vital part of its business strategy and sustainability goals. This report captures learnings from the pilot stage of Flipkart's EV deployments to support and guide India's journey towards the electrification of e-commerce vehicle fleets. It highlights e-commerce business expectations from vehicle original equipment manufacturers (OEMs), logistics partners, vendors, driver partners and policymakers, among other stakeholders.

We hope that these lessons will help Flipkart scale up its operations and encourage the electrification of delivery fleets across platforms in India and the world. The approach of 'learning by doing' taken by pioneer e-commerce companies, such as Flipkart and its stakeholders, will provide a direction for the industry to follow. Some of the key lessons learned from Flipkart's EV adoption experience are summarized below:

- E-commerce companies need to signal demand and work in close collaboration

with OEMs to develop the right-sized EVs for delivery use cases.

- Vendor-owned fleets (vis-à-vis driver-owned vehicles) support early EV adoption, but they need to be integrated in an e-commerce firm's highly optimized delivery ecosystem. Improved access to capital and financing is also required for vendors to scale up.
- A vendor-managed charging⁸ infrastructure model will distribute the risk among parties who are best positioned to mitigate them and suit the requirements of e-commerce companies.
- Driver partner adoption can be best influenced by improving awareness, income, and by providing an efficient and accessible charging network.

WBCSD has been working with India's mobility value chain to help accelerate the adoption of EVs so that businesses can be a part of the solution to India's urban pollution and emissions challenges. Through this report, WBCSD aims to support greater electrification of e-commerce deliveries in both the Indian and global markets.





Summary: Guidance for EV ecosystem action

This report brings together Flipkart’s EV adoption journey. It identifies key unaddressed barriers to EV adoption in e-commerce, highlights Flipkart’s approach to solve some of the issues, proposes

recommendations regarding role of all stakeholders involved in the Indian EV ecosystem to address those barriers and intends to serve as a learning resource for e-commerce companies looking to transition to EVs.

It focusses on a defined scope of four prioritized themes (mentioned in table 1), each associated with one or more stakeholders in the value chain.

Table 1: Guidance for EV ecosystem action on e-commerce delivery electrification

Theme	Challenges	Role of each stakeholder
 A Vehicle availability and development	<ul style="list-style-type: none"> Lack of reliable right-sized EVs Limited understanding among OEMs about e-commerce firm’s EV needs and performance expectations Lack of capital and operational expertise among new OEMs 	<p>E-commerce companies need to signal demand and collaborate with OEMs to develop right-sized delivery vehicles.</p> <p>OEMs need to innovate to fill product variability and reliability gaps.</p>
 B Optimal fleet ownership models	<ul style="list-style-type: none"> Absence of long-term contracts impedes visibility on returns for vendors Managing multiple small-scale EV vendors across states remains a concern for e-commerce firms Limited vendors in tier-2 and tier-3 cities in India limits scale Uncertainties around longevity and resale value hinders the business case 	<p>EV vendors need to scale up to cater to the pan-India requirements of e-commerce companies.</p> <p>Financial institutions, together with OEMs, must address the barriers related to access to capital and EV financing.</p>
 C Charging infrastructure ownership and utilization	<ul style="list-style-type: none"> Lack of public or commercial charging infrastructure Lack of technical know-how on charging in e-commerce firms Multiple regulatory and economic barriers related to charging infrastructure Lower profitability for vendors due to suboptimal charging utilization 	<p>E-commerce firms must leverage specialist vendors or charging point operators (CPOs) who offer packaged solutions to overcome the challenges of availability, ownership, and optimization of charging infrastructure.</p> <p>Policies must evolve to support charging of delivery vehicles.</p>
 D Advancing the benefits of driver workforce	<ul style="list-style-type: none"> Driver skepticism about EVs as a viable transport option Inefficient charging planning causing reduction in driver earnings 	<p>Vendors need to invest in drivers’ awareness, capacity building, workforce development and provide an efficient and accessible charging network.</p>

① Introduction



1 Introduction

The e-commerce industry in India has grown to USD \$84 billion in 2021 and is expected to grow to USD \$350 billion by 2030.¹ Since 2020, the COVID-19 pandemic has brought a digital shift in shopping behavior in India and enhanced trust in e-commerce, further accelerating growth. A surge in user growth, as high as 50%, was witnessed soon after the onset of the pandemic.⁹ As e-commerce grows in India, it is important to decouple its potential environmental impact from the economic benefits.

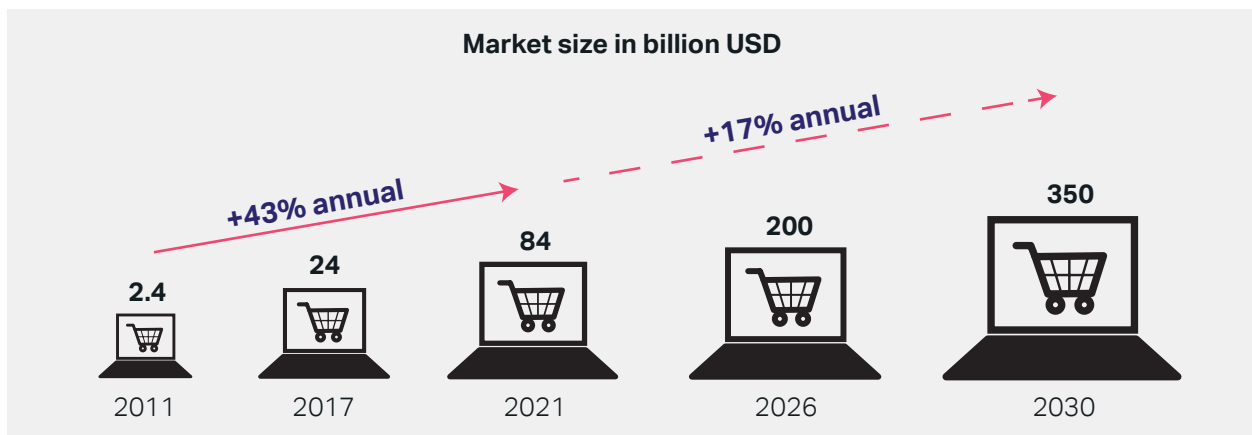
The e-commerce sector is rapidly evolving, shaped by new technologies, demands, ideas, and is spearheading innovative sustainable solutions.

Low-emission shipping options, avoiding the use of plastics, managing efficient deliveries and returns, and reducing last-mile deliveries through order pick-ups are some of the interventions that can enable this transition.

Urban freight and last-mile distribution are amongst the biggest contributors to an e-commerce company's carbon footprint as they constitute approximately 65% of the company's Scope 3 emissions.⁷ The existing urban logistics system that helps deliver our goods on time is not always sustainable, and the growing shipments of e-commerce goods to consumers' doorsteps have a negative impact on cities, including by increasing the quantum of carbon emissions, local vehicular and noise pollution, and traffic congestion.

In 2020, the World Economic Forum (WEF), together with WBCSD and McKinsey & Company developed 24 supply chain and technology interventions that e-commerce companies needed to adopt to solve delivery challenges and lower emissions without affecting profits.¹⁰ Of these, the accelerated adoption of EVs is a prioritized intervention that offers the highest potential impact towards the abatement of urban emissions and air pollution.

Figure 1: Growth of India's e-commerce market



The case for electrifying e-commerce mobility

1. The critical role of the e-commerce sector towards a sustainable economy

The e-commerce industry is expected to contribute 3.5% to the country's GDP by 2030.¹ It will play a critical role in the country's transition to EVs (and a sustainable economy) by creating demand, fostering innovation in technology, unlocking accessibility to EVs and supporting the development of a formal workforce for the EV sector.

The total size of India's e-commerce fleet as per current estimates is approximately one million vehicles spread across the two-wheeler (2W), three-wheeler (3W), small commercial vehicle (SCV), and medium commercial vehicle (MCV) segments.⁶ This includes last-mile delivery vehicles with a daily utilization of 100–150 kilometers, and long-haul transport (from factories to warehouses or regional fulfilment centers) with a daily utilization of 150–250 kilometers.

2. The e-commerce clean environment 'opportunity'

E-commerce businesses must decarbonize their mobility operations because their long-term success depends on thriving and healthy cities. In this hyper-competitive industry, a transition to EVs is good for the environment and for business.

As per the authors' analysis, a 100% adoption of EVs for e-commerce deliveries in India by 2030 could prevent 44% of the total CO₂ emissions caused by equivalent ICE vehicle variants, reduce the consumption of fossil fuels by 32 billion liters per year and prevent approximately 76 million tons of CO₂ emissions per year.

Figure 2: Annual CO₂ emissions avoided (in million tons) by electrification of e-commerce vehicles, 2030⁶

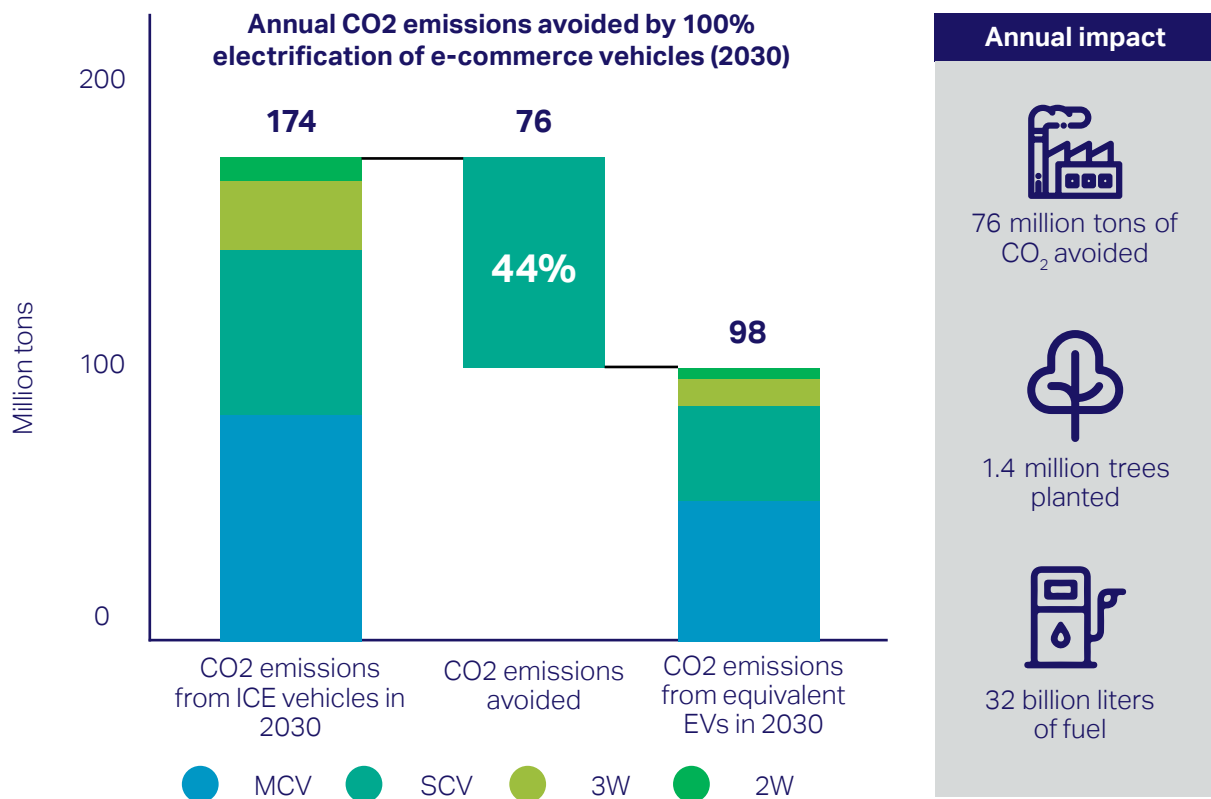
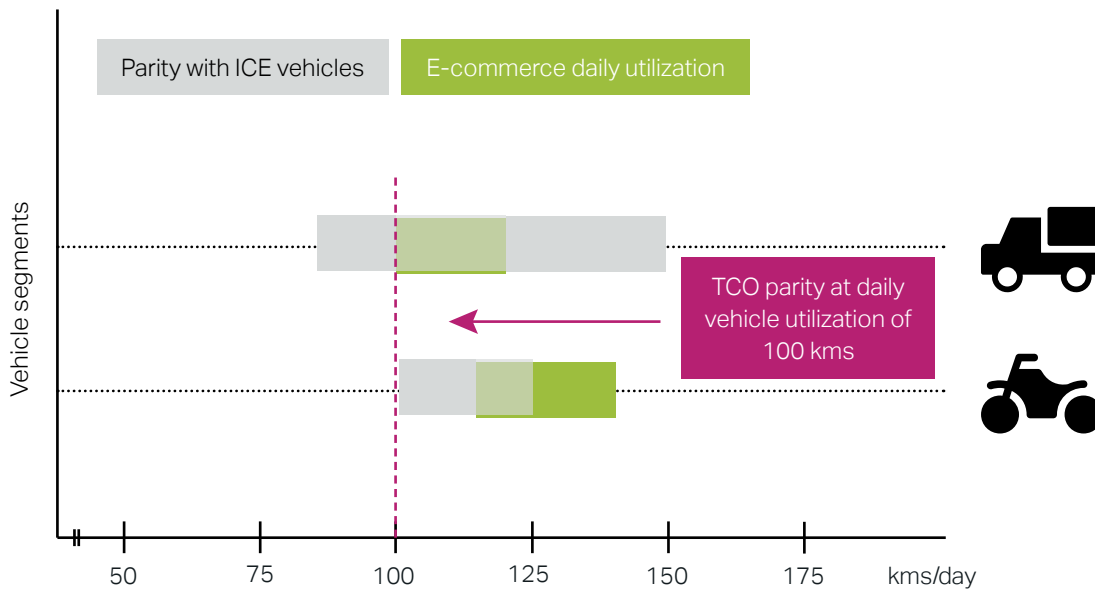


Figure 3: EVs' TCO parity comparison with respect to ICE vehicles at e-commerce delivery utilization levels



3. The strong business case for EV adoption due to higher utilization and scalability

The technology to electrify transport already exists and is evolving rapidly. High daily vehicle utilization and the large scale of operations makes the sector an ideal candidate for commercially viable electrification.

As shown in figure 3, at the current utilization levels, electrified e-commerce deliveries are already competing with or are on par with ICE vehicle-based deliveries for the 2W and 3W vehicle segments. EVs achieve a total TCO parity with their ICE counterparts when their daily utilization is above 100 kilometers for 2Ws and 3Ws.¹¹ These parity thresholds are expected to incline further in favour of EVs, primarily due to plummeting battery costs and rising fuel costs.

4. Ease of operations through fixed EV charging hubs

The characteristics of e-commerce fleets include fixed pick-up points, consistency of daily kilometers travelled and predictability of routes and energy demand. This makes it easier for e-commerce companies to incorporate EV fleets and charging infrastructure into routine operations. Battery swapping at hubs is another convenient and practical solution that increases vehicle utilization and driver partner earnings. These charging/swapping hubs will also have predictable energy consumption patterns, which have the potential to support grid balancing in the future.

5. Sustainability is fundamentally changing consumer preferences

Consumers are increasingly rewarding companies acting on sustainable transitions and are penalizing who do not act responsibly. A slow transition to EVs could potentially mean losing a competitive advantage over other more agile and rapidly evolving e-commerce companies.

② Flipkart's EV adoption journey



② Flipkart's EV adoption journey

Flipkart is the first e-commerce marketplace in India to commit to transitioning 100% of their vehicle fleets to EVs by 2030 by joining the [EV100 global initiative](#).⁵ Their drive towards electric mobility, which began with pilot programs in Indian cities in 2017, is now a significant sustainability initiative and a pioneering step for India towards sustainability. The organization is uniquely placed to catalyze the transition of India's urban freight and delivery ecosystem to electric, while improving their operational efficiency and meeting their corporate sustainability goals.

Flipkart's operations and the electric mobility transition opportunity

E-commerce logistics are both operationally and financially complex. Ensuring customer delight requires an exceptionally strong supply chain management system while also managing the cost of delivery and returns.

To support their e-commerce platform and operations, Flipkart manages a fleet comprising long-haul vehicles, commercial four-wheelers, 3Ws and 2Ws, covering 100% of the serviceable pin codes across India. In this context, committing to a transition in vehicle technology and related energy infrastructure is a bold, large-scale shift with significant implications. In parallel, this presents a unique opportunity to leverage electric mobility's economic and environmental benefits.

Flipkart's journey to electrification

Flipkart's journey towards electrification began in 2017 with pilot projects in major Indian cities, first with electric bikes (e-bikes) and subsequently with electric vans (e-vans). The pilot phase has had its challenges and learnings, but it gave Flipkart the confidence to commit to an ambitious EV100 target.

The fundamental motivation for Flipkart to join the EV100 initiative has been to support India's electric mobility goals by demonstrating demand to the EV ecosystem while acting on the commitment. The initiative allowed Flipkart to be a part of a group of global leaders that offer unique access to mutual learning and stakeholder dialogue opportunities. In parallel, they helped shape the market demand for EVs in e-commerce. Flipkart's journey to electrification can be divided into the pilot phase and the scale-up phase that is just beginning.

Figure 4: Flipkart's electric mobility current operations and ambitions

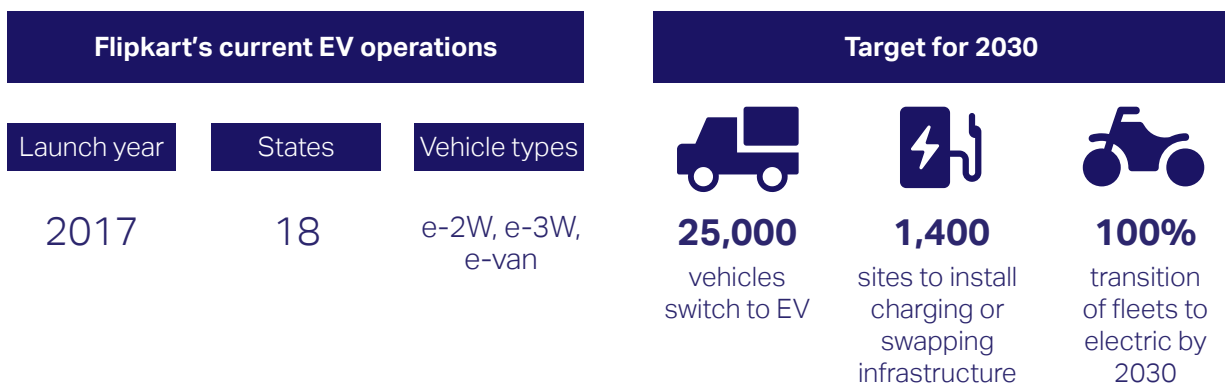
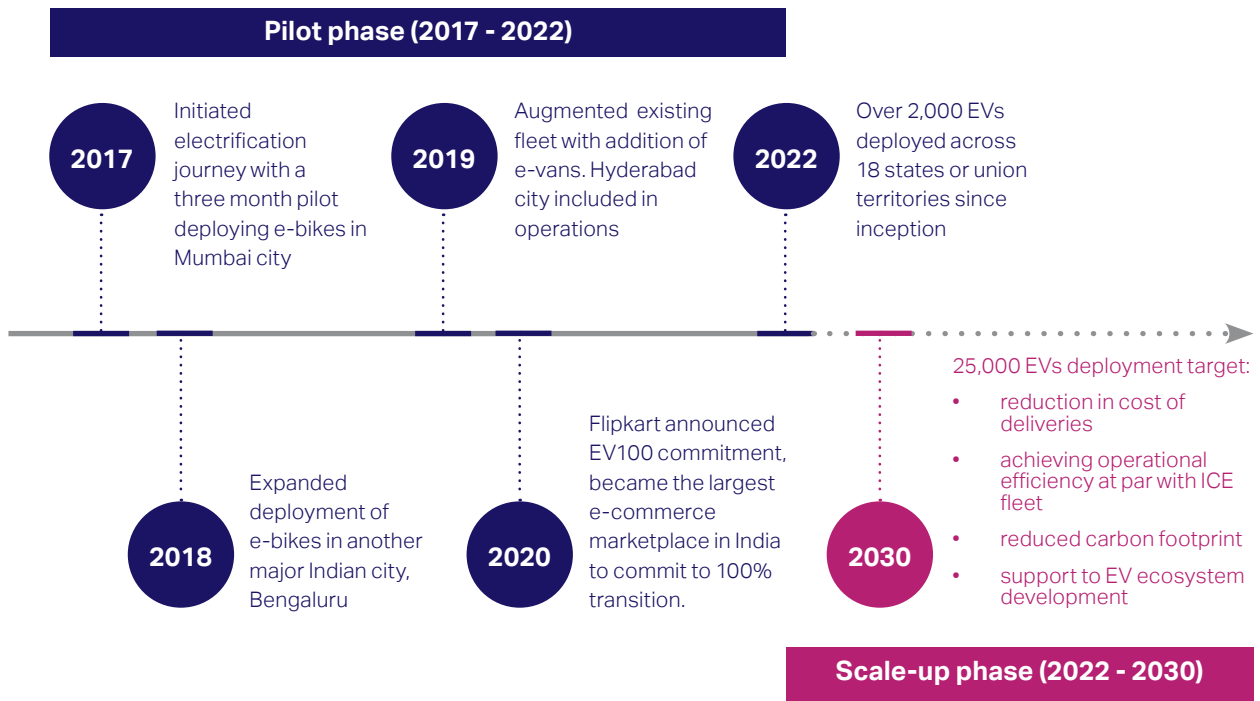


Figure 5: Flipkart's EV adoption timeline



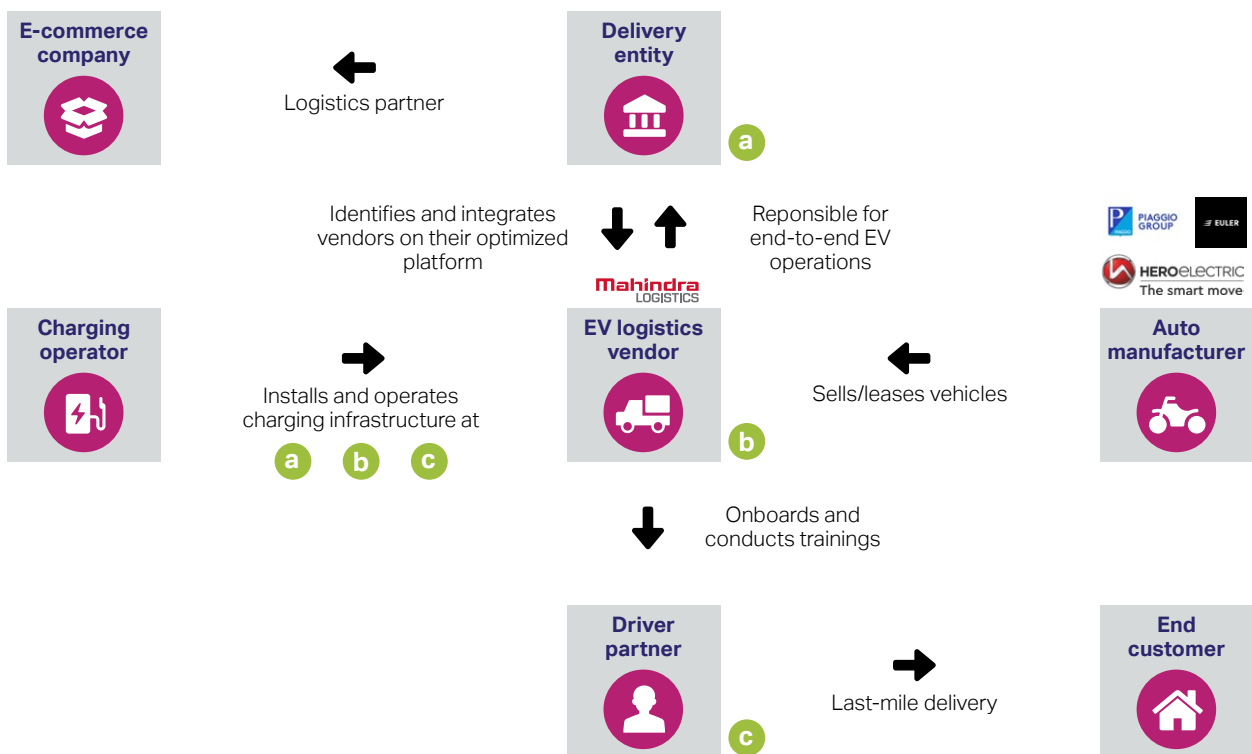
Stakeholder map and interaction between stakeholders

Over the past five years, Flipkart

has worked towards creating a vast network of EV ecosystem partners across vendors, OEMs, aggregators, charging providers, policymakers and skill

development agencies. Figure 6 shows the stakeholder map of Flipkart's EV operations.

Figure 6: Flipkart's stakeholder map for fleet electrification and interaction between stakeholders



③ Key learnings



③ Key learnings

Analysis framework for the report

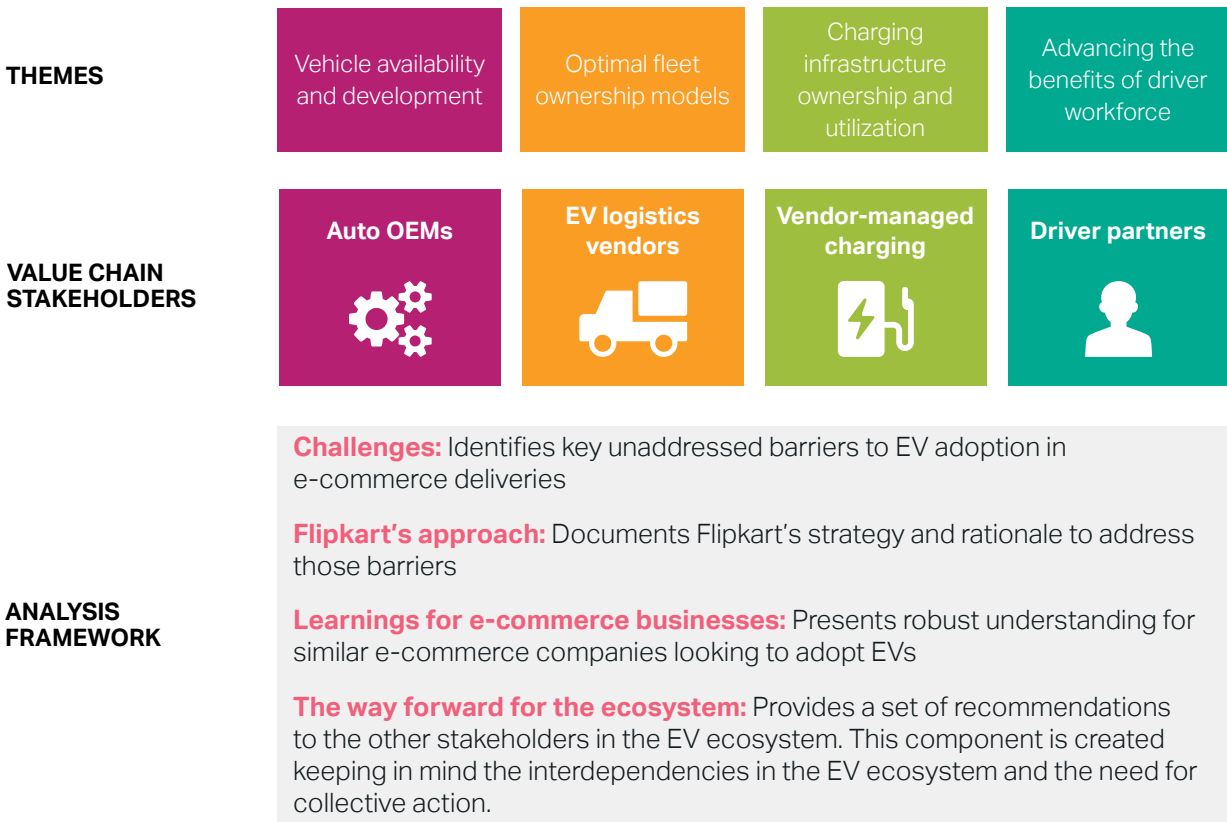
This report brings together Flipkart’s EV adoption journey and learnings for existing and prospective e-commerce companies in their transition to an EV fleet. It presents a comprehensive understanding of

various aspects of transitioning to EVs from ICE vehicles in e-commerce delivery fleets. In addition, the recommendations of this report are applicable to all stakeholders involved in the EV ecosystem.

The report focuses on four prioritized themes, each

associated with one or more stakeholders in the value chain. The analysis framework lays down barriers, Flipkart’s approach, learnings for e-commerce businesses and the way forward for the ecosystem.

Figure 7: Structure of the report





Vehicle availability and development

E-commerce companies need to signal demand and work in close collaboration with OEMs to develop the right-sized EVs for delivery use cases.

Delivery operations require a range of vehicle options for different use cases and tonnage, with a balance of volumetric capacity with respect to weight. The right-sized vehicles help improve supply chain efficiency and optimize costs. While the supply ecosystem of delivery vehicles is mature for ICE vehicles, it is still nascent for EVs. Several new EV options are available for 2Ws and 3Ws, brought to market primarily by start-ups. However, options thin out as we move to vehicles with a larger form factor.

Proven products with the required reliability remain a priority for logistics partners and driver-owners to willingly invest in and own the vehicles. In this context, much work is still needed for the market to offer a variety of reliable EV options for logistics.

Challenges

There is a lack of reliable, right-sized EV options.

A key impediment in the uptake of EVs among interested delivery companies, including Flipkart, has been the lack of vehicle choice, especially for larger form factors. During the initial phase of Flipkart's EV adoption, there was great difficulty in finding and mapping vehicles of required use cases for the market scenario. EV variant availability in the serviceable regions of e-commerce is still a challenge.

There is limited confidence about the ability of the EVs that are currently available to cope with the varying nature of operations, range requirements and performance in different operating terrains.

For widespread adoption, the robustness and operational range (in kilometers per charge) of the available vehicles also needs to be assured across the varying geographies and terrains that Flipkart operates in. Flipkart's delivery operations span across 100% of the serviceable pin codes in India. Given the scale, this also includes large areas with landscapes that can challenge any vehicle that is not rugged and robust. Using some of the currently available vehicles and solutions can become a challenge in such a scenario.

There is a lack of capital and operational expertise to deliver reliable, mass market vehicles along with the required national after-sales service support from the start-ups/new OEMs.

Start-ups have the motivation, flexibility and capacity to innovate and develop customized new or retrofitted delivery vehicles, and many emerging start-ups are considering offering solutions to delivery companies. The motivation for these start-ups has been to gain a foothold in this new segment, collect valuable experience and profit through scaled production.

However, when new start-ups

meet the operational rigor of large and complex e-commerce operations, it can result in an expectation-performance mismatch. For example, Flipkart observed typical stability issues, such as toppling, in the first 3W EV models they adopted. This highlights the need for start-ups to invest in rigorous vehicle testing to ensure ruggedness, durability, serviceability, stability, safety, battery performance, payload/volumetric capacity, asset life, range and speed.

Flipkart's approach

Support innovative start-ups by prioritizing the transition of smaller form factor vehicles where a reliable range of EVs are available.

In the initial phase, Flipkart focused on deploying vehicle segments that were available and already economically viable, such as lighter EVs (like 2Ws and 3Ws). The lighter vehicle segment enjoys more immediate TCO parity vis-à-vis their ICE counterparts, relative to the heavier vehicle segments, translating to less daily utilization to break even. Going forward, Flipkart envisions incorporating heavier EVs (such as MCVs or LCVs) into their fleet as reliable options become available in the market.

Work with OEMs to develop mass-market EV options for e-commerce use cases.

To develop and deploy the right kind of vehicles for e-commerce use cases, Flipkart established partnerships with ecosystem stakeholders, primarily OEMs such as Mahindra, Hero Electric, Piaggio and Euler Motors.¹² Flipkart communicated the demand (which included signing the EV100 commitment), shared delivery requirements and proposed vehicle specifications. Specific to Flipkart’s vehicle requirements, some of the vehicle refinements achieved through these partnerships include better battery capacity (increased range), better carrying capacity (increased payload and size of the box) and better positioning of the battery to save it from short-circuiting during the monsoon.



An accelerated fleet electrification by Flipkart and other e-commerce marketplaces can provide the demand signal required for manufacturing and infrastructure creation, helping solve problems related to early adoption while helping build the ecosystem and public confidence required for mass adoption in India.

Sohinder Gill
CEO, Hero Electric



Learnings for e-commerce businesses

E-commerce companies need to signal demand and work in close collaboration with OEMs to develop the right-sized EVs for delivery use cases.

The development phase of the market presents an opportunity for delivery companies to signal demand (such as Flipkart’s commitment to the EV100) and define the requirements for delivery vehicles that can meet the pushing capability and reliability criteria of e-commerce operations at the right price point. To enable this, delivery companies and OEMs need to work together to conceptualize and design vehicles to meet business requirements. Table 2 showcases the desired EV specifications for Flipkart’s operations.

There are various approaches to collaborating with OEMs, such as sharing requirements on modifying an existing vehicle model or contributing to designing a completely specific vehicle concept. Both approaches affect investments incurred by OEMs on design and production differently and entail an economic trade-off between custom fit-for-purpose EVs vs scale-manufactured EVs, which delivery companies and OEMs can assess and finalize.

The way forward for the ecosystem

OEMs need to innovate to fill the existing variability and reliability gaps.

To cater to the growing demand and reliability concerns of delivery companies, OEMs need to provide dependable solutions for the logistics sector. It is imperative that OEMs rise to the challenge, innovate and design vehicles which match industry performance requirements.

Table 2: Flipkart’s desired EV specifications

Desired specifications	2Ws	3Ws
Speed (kilometers/hour)	25-50	35-50
Range (kilometers)	60-80	80-120
Payload (kilogram)	150-200	450-500
Volumetric capacity (cubic feet)	-	120
Charging time (hour)	<4	<4
Battery capacity (kWh)	2-3	>5



Optimal fleet ownership models

Vendor-owned fleets (vis-à-vis driver-owned vehicles) support early EV adoption, but they need to be integrated in an e-commerce firm's highly optimized delivery ecosystem. Improved access to capital and financing is also required for vendors to scale up.

E-commerce companies have a highly optimized delivery ecosystem that is managed through their delivery arms, where the drivers are well trained to provide extremely high productivity and delivery efficiency. However, managing multiple vendors (across states) can often lead to efficiency drawbacks.

New EV logistics vendors, such as Mahindra Logistics, Euler, MoEving, ETO Motors and Golden Aero, have invested in delivery fleets to gain experience in economic viability and vehicle reliability. After agreeing on performance and reliability requirements, Flipkart has tied up with these vendors to support the early adoption of EVs. In parallel, Flipkart has also been looking for new reliable partners to scale up their fleet in other cities.

Challenges

The absence of long-term contracts impedes visibility on returns for vendors.

Pivoting to EVs is a big investment decision for logistics vendors and it comes with multiple challenges including high upfront purchase costs, concerns related to vehicle performance (range, payload etc.), and matters related to the usage of their existing ICE fleets, some of which may have significant operational life remaining.

Long-term contracts and minimum count guarantees can protect vendors from some of the risks associated with buying or leasing EVs. For example, new vendors usually look for a minimum count guarantee of 10 vehicles per city.

Managing multiple small-scale EV vendors across states remains a concern.

Progressive vendor start-ups acknowledge the opportunity in EV transition where the deployment of EVs can support a lower TCO and that usage and charging infrastructure investments can be optimized at the fleet level. For progressive vendors, companies like Flipkart are the right partners to achieve scale. While vendors are willing to invest in EV fleets, their lack of scale and experience within Flipkart's highly optimized delivery ecosystem can sometimes mean lower productivity and efficiency.

There are also productivity losses as the driver partners working for these vendor start-ups are not experienced with the Flipkart ecosystem and are unable to deliver the kind of results achievable by rider partners with several years of training and experience. There is an additional operational cost to e-commerce companies in managing multiple small-scale EV vendors instead of a few prominent ICE vendors.

The limited number of vendors in tier-2 and tier-3 cities in India limits scale.

Currently, only a few financially strong EV vendors offer reliable products. Identifying, onboarding and retaining vendors willing to provide EVs is a challenge in tier-2 and tier-3 cities.

Uncertainties around longevity and resale value hinders the business case.

Being a newer technology, EVs have unpredictability about vehicle life, maintenance costs and resale value. There is also a non-existent second-use market for EVs. The combined impact of these aspects results in higher financing costs of the EVs as compared to traditional financing for an ICE vehicle. Driver buyers currently face an array of capital and financing challenges, which includes limited specialized financing options, high interest rates, high insurance rates and low loan-to-value ratios.

Flipkart's approach

Support local EV vendors to initiate early adoption and gain on-ground experience.

Flipkart has partnered with several e-logistics vendors across cities, including tier-2 and tier-3 cities, after agreeing on performance and reliability requirements. Their operations are creating market experiences, showcasing demand for right-sized vehicles and enabling an ecosystem for driver training.

The experience of and insights from new small-sized EV vendors are crucial to convincing existing prominent ICE fleet aggregators and rider partners to switch to EVs.

Extend contract terms to solicit investments from existing and new vendors and partners.

To enable early adoption, Flipkart's new and existing vendors are offered longer-term contracts, resulting in greater visibility and lower risks for vendor partners. The standard contracts for almost all EV vendor partners were increased from one year to between three to five years.

Learnings for e-commerce businesses

Vendor-owned fleets (vis-à-vis rider-owned vehicles) support early EV adoption, but they need to be integrated in an e-commerce firm's highly optimized delivery ecosystem. Improved access to capital and financing is also required for vendors to scale up:

- While rider-owned vehicles have been the mainstay of e-commerce operations, vendor-owned fleets are most likely to lead early EV adoption. New vendors can optimize fleets, make investments in charging and manage the overall risks better. Rider-owned vehicles may become affordable and suitable once the business models and technology are proven and a public charging infrastructure has been built up.
- Redesigning the duration of contracts and minimum count guarantees are needed to meet the altered expectations of both vendors and e-commerce

players. This will assist vendors in scaling up operations.

- Driver partners need to be trained and integrated within the highly optimized e-commerce ecosystem, which is expected to come with experience.
- Multi-stakeholder collaboration and innovative solutions are needed to enable low-cost financing at scale for EV vendors. An approach to address this is covered in the next section in detail.

The way forward for the ecosystem

Auto OEMs, together with financing institutions, need to develop a formal secondary market to improve EV financing.

EV resale value should be improved by developing a formal secondary market as this will provide an assurance to financial institutions about the salvage value of the EVs and help remove resale risk in case of borrower default.



Low-cost financing is critical for EVs to achieve scale. Financial institutions like banks and non-banking financial companies (NBFCs) will need to build up their confidence and capabilities to finance the EV sector, while understanding the risks of this new technology. To enable this reform, several actors will need to align and consider supplementary solutions.

Rampraveen Swaminathan
MD & CEO, Mahindra Logistics



OEMs can design buy-back programs, re-possession guarantees, refurbishments and the resale of the vehicles. In parallel, buy-back programs will require OEMs to tie up with financial institutions for design and implementation aspects. Further, OEMs may collaboratively start and operate a branded and guaranteed secondary market for EVs on the lines of ICE vehicles.

Multiple small-sized vendors must support early EV adoption for e-commerce businesses but in the long term, aggregated solutions will be required.

Flipkart manages a fleet comprising of long-haul vehicles, commercial four-wheelers, 3Ws and 2Ws, covering 100% of the serviceable pin codes across India. Managing more vendors translates to lower efficiency and more cost. To address these, current EV vendors will be required to cater to scale, build a presence in tier-2 and tier-3 cities and offer different vehicle products (2Ws, 3Ws, etc.).

Vendor managed charging



Charging infrastructure ownership and utilization

A vendor-managed charging infrastructure model will distribute the risk among parties who are best positioned to mitigate them and suit the requirements of e-commerce companies best.

Ambitious fleet electrification targets need to be accompanied by equally rapid deployment of charging infrastructure. Fixed pick-up points, the consistency of daily kilometers travelled and predictability of routes give e-commerce delivery fleets an advantage in the deploying, managing, and planning and occupancy of charging infrastructure.

However, EV charging is an uncharted territory for many early adopting businesses. It presents various challenges, particularly in the risks associated with ownership. While delivery companies are adept at traditional fleet management and optimization, they lack the technical expertise to install, operate and optimize chargers. To overcome these challenges, Flipkart adopted some mitigation strategies.

Challenges

A lack of public or commercial charging infrastructure impedes scaled adoption.

The adequacy of charging infrastructure is a prerequisite for the successful adoption of EVs for commercial purposes. In the current scenario, the charging infrastructure to support EV fleets is widely missing from delivery hotspots, warehouses/hubs and public locations.

There is a lack of technical know-how and there are regulatory and economic barriers related to charging infrastructure.

As Flipkart started to explore EV charging solutions, there were prevalent risks of owning infrastructure combined with an evolving policy landscape. WBCSD's 2021 report, [Policies for India's global leadership on EV adoption](#), explains the regulatory barriers and proposed solutions to increase business investments in charging infrastructure. Along with these barriers, there are also economic barriers, such as the high cost of land/space in public locations.

A suboptimal charging utilization translates to lower profitability for vendors when other fixed costs remain constant.

Factors like low EV penetration and unmanaged charging of fleets could lower the utilization rates of chargers. This will result in low profit margins and limited financing options available for vendors/CPOs offering charging solutions.

Flipkart's approach

Leverage specialist vendors offering packaged solutions to overcome the challenges of the availability, ownership and optimization of charging infrastructure.

Flipkart uses a model in which many specialist vendors provide end-to-end EV solutions, including charging infrastructure installation, management and maintenance.

These solutions smoothen the implementation and operation for e-commerce businesses, while allowing them to stay asset light.

Provide land and related facilities at warehouses and hubs to install captive charging.

The accessibility of real estate at affordable prices near city centers is often cumbersome and difficult for vendors, which Flipkart has addressed. They supported vendors by providing space to set up charging facilities in warehouses and logistics hubs, which helped significantly bring down the overall charging cost.

To understand the power requirements of charging infrastructure at their hubs, the vendors assessed the availability of free load across some of their hub premises, enabling them to make optimized decisions.

Charging viability assessment at one of Flipkart's hubs

- Connected load: 10 kW
- Peak utilization: 1-2 kW
- Available free load: 8-9 kW
- Power output of slow chargers
- Decision: Install two slow chargers of 3 kW each

Offer demand guarantees to reduce the utilization risk for the vendors providing charging solutions, increasing economic viability.

Flipkart guaranteed adequate demand for the optimal utilization of charging infrastructure to make it viable for vendors. Demand guarantees also offer a much more predictable revenue stream and regular cash flows, resulting in a lower financing cost.

Inform relevant policymakers on market feedback from their early adoption experience.

To address regulatory concerns, Flipkart has been actively informing policymakers about their EV adoption and charging deployment experience. They are a participant in the Delhi government-run pilot project on electrifying deliveries, Deliver Electric Delhi.¹³ They have also been an active knowledge contributor to [WBCSD's 2021 report on EV policies](#), aimed at enhancing collaboration between policymakers and businesses on dialogue related to EV policy (including deliveries).

Learnings for e-commerce businesses

A vendor-managed charging infrastructure ownership model will distribute the risk among parties who are best positioned to mitigate them and suit the requirements of e-commerce companies best.

The economic viability of charging has been a significant constraint to adoption. Vendor-owned/operated charging infrastructure derives its economic viability from higher utilization provided by the vendor's captive fleet, and delivery companies offering vendors demand guarantees make the business of charging much more viable. In the future, the presence of a public charging network will help mitigate range anxiety and reduce dry run kilometers travelled by delivery partners, adding to the profitability of businesses.

The way forward for the ecosystem

Shared infrastructure will help improve infrastructure utilization, accelerate

capital expenditure (CAPEX) amortization and address range anxiety concerns.

Collaboration between fleet operators and industry players with similar visions can support investments in setting up charging infrastructure and help drive faster adoption and scaling up. This will help bring down charging costs and the capital expenditure associated with its set-up. The collaboration will also ensure that charging assets can have higher utilizations as they will be supported by multiple fleet operators. In 2021, WBCSD highlighted nine key business and policy actions that can unlock shared value and improve the business case for sustainable infrastructure implementation through their report, [Value framework for sustainable charging infrastructure](#).¹⁴

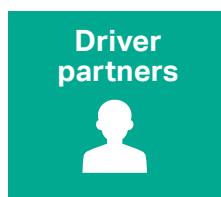
Policymakers need to revisit governing regulations and institute clear guidelines that can accelerate the installation of EV charging networks. Several challenges related to charging infrastructure deployment (mentioned below) remain that need to be resolved through regulatory interventions.

Table 3: Flipkart's generic ownership and operations model for EV charging

Mode	2W	3W
Location	Warehouse	Warehouse or EV logistics vendor's site
Infrastructure ownership	EV logistics vendor or CPO	CPO
Infrastructure operator	EV logistics vendor	EV logistics vendor

Charging regulatory barriers

- Limited feeder capacity in some locations - difficulty in setting up high power infrastructure
- Lack of regulations on grid upgradation cost
- Difficulties in availing state-offered EV tariffs
- Lack of charging/swapping standardization
- Lack of building regulations for infrastructure space. Often, there is resistance from warehouse building owners
- Uncertain timelines - time taken by some distribution companies is long



Advancing the benefits of the driver workforce

Driver partner adoption can be best influenced by improving awareness, income, and by providing an efficient and accessible charging network.

The e-commerce industry is growing into one of the biggest job creators for gig workers, particularly for driver partners. The demand for delivery driver partners across some platforms rose by about 160% in 2021 vis-à-vis 2020.¹⁵ The figures are expected to increase significantly as the sector grows. Thus, it becomes critical that new driver partners drive/adopt EVs as their first vehicle.

Challenges

Driver partners are skeptical about EVs as a viable transport option.

Driver partners are often skeptical about the vehicle performance, i.e., speed, vehicle resistance to inefficient road infrastructure, range and safety issues. Some of this skepticism can be attributed to the perceptions based on the performance of earlier products, and these factors restrict the driver partners to move away from the status quo. Over time, an increase in product credibility and awareness will help driver partners change their behavior and be willing to adopt EVs.

Inefficient charging planning leads to suboptimal deliveries and brings down driver partner earnings.

Unlike traditional logistics operations, where re-fueling time is short, EVs take a longer time to charge. During peak delivery hours, this translates into a 'lost earning opportunity' for driver partners.

The range limitation considering current battery sizes and specifications and the time required to locate, navigate and charge the vehicles may result in suboptimal productivity.

In parallel, a lack of necessary infrastructure expansion results in increased dry runs, impacting earnings and productivity. Dry run denotes the kilometers that a vehicle specifically covers to reach a charging location while not being used for income-generating delivery purposes. All these factors reduce the EV adoption benefits for driver partners.

Flipkart's approach

Ensure vendors comply with procedures of appraising and training delivery partners.

To change the driver partners' perceptions around EVs, vendors arranged awareness and training workshops for them. The training included information on upkeep, maintenance, and efficient and safe operations of EVs. There is an additional cost to carrying out these trainings, and this was factored into the contracts with Flipkart.

Advocate to support driver partners with overnight home charging facilities.

Flipkart nudged their EV logistics vendors towards this arrangement. Availing overnight charging facilities has helped increase adoption among driver partners.

Early focus on less time-sensitive delivery segments.

Flipkart, during their pilot phases, prioritized less time-sensitive deliveries (such as consumer electronics, personal care products, etc.) to be delivered by EVs, while excluding time-sensitive deliverables (such as groceries, perishable items, etc.). They have enabled these use cases first to foster the first wave of electrification, which can prime the system for time-sensitive deliveries as charging technology improves in the future. This eliminated possibilities of delayed deliveries resulting due to charging downtime, providing a cushion to driver partner ratings (earnings).

Learnings for e-commerce businesses

Driver partner adoption can be best influenced by improving awareness, income, and by providing an efficient and accessible charging network.

A key motivation for delivery partners to switch to electric has been rising fuel costs which increasingly eats into their income. The suitable placement of charging infrastructure also affects their income.

The strategic placement of captive/shared charging stations reduces dry runs and accessibility to overnight charging facilities at rider partner homes (slow charging) or in the vicinity lowers the daily charging downtime during commercial hours and reduces working hours for rider partners.

In parallel, vendors must play a role in influencing rider partners awareness and capacity building, which is covered in the next section.

The way forward for the ecosystem

Vendors need to invest in awareness, capacity building and workforce development.

Uncertainties surrounding vehicle performance and a lack of information around TCO are among the other reasons that hinder the adoption of EVs among rider partners. Properly structured awareness and training programs, managed by vendors, can convince driver partners to adopt EVs and operate them efficiently. A few examples include assistance with special licenses, partnerships with educational institutes, curated operational and maintenance training on EVs and training on organizational policies.

Trained drivers translate into improved performance, and training should be an integral part of the adoption journey. In addition, an efficient vendor-managed charging network could reduce the strain of cost and time incurred by driver partners.



The e-commerce electrification should be brought alongside improving the experience, well-being and incomes of the gig workforce, i.e. the driver partners, who are at the center of any logistics operation.



Vikash Mishra
CEO, MoEVing

Conclusion

The e-commerce delivery sector is uniquely positioned to lead the electric mobility transition in India.

The rationale for transitioning to electric is getting stronger for e-commerce delivery fleets in India, ahead of several other use cases. Many characteristics, which are unique to e-commerce fleets, such as fixed pick-up points, the consistency of daily kilometers travelled, and the predictability of routes and energy demand, makes this sector well placed to incorporate EV fleets and charging into routine operations.

E-commerce businesses now recognize EVs as a cost-improvement measure, in addition to running their operations sustainably, improving customer satisfaction and meeting regulatory compliance.

There is increasing business intent and conducive policy environment.

EV100 commitments from companies like Flipkart will help galvanize e-commerce businesses' willingness and action to create a new mobility ecosystem of delivery vehicles.

It is set to inspire other businesses that have been sitting on the fence for a while to act faster. Flipkart's accelerated action and their successful experience in overcoming various initial hurdles show that a rapid transition to EVs is technically, commercially and practically feasible today.

Various ministries of the Indian government agree that e-commerce electrification must be prioritized in the EV adoption sequence. Increasingly, state governments are also instituting policies to enable related charging infrastructure. This includes the recently announced schemes by the Delhi³ and Maharashtra⁴ governments, mandating e-commerce companies to transition to EVs. Other state governments and the central government can also take a similar approach to provide a clear direction for e-commerce businesses to accelerate EV investments.

Early moving e-commerce businesses need to be agile.

Being an early adopter demands flexibility and adaptability. The electric mobility market is highly dynamic and companies transitioning into the electrification of deliveries need to be highly agile in terms of their business models as well as operations. An ideal scenario would have been to replace ICE vehicles with EVs without

impacting tried-and-tested business models. However, this is a dynamic market where innovative business models are competing to squeeze efficiencies from the energy transition in mobility. Forward-looking businesses should expect disruptive changes and adapt rapidly to changing market dynamics. This includes making provisions for changes in vendor contracts, bearing additional operational costs for managing multiple small-scale vendors and more.

Each stakeholder has a role to play in enabling the EV transition.

Creating any new and sustainable system requires a collaborative approach. The real value for EV transition in the e-commerce delivery sector can be created when the transition strikes win-win partnerships among stakeholders. With all stakeholders aligning on the vision to transition, the market is set to grow, providing unprecedented opportunities for all.



Partners for this report



FLIPKART - REMOBILITY MEMBER

The Flipkart Group is one of India's leading digital commerce entities and includes group companies Flipkart, Myntra, Flipkart Health+, Flipkart Wholesale, and Cleartrip. Our efforts to democratize commerce in India, drive access and affordability, delight customers, create lakhs of jobs in the ecosystem and empower generations of entrepreneurs and MSMEs have inspired us to innovate on many industry firsts. Together with its group companies, Flipkart is committed to transforming commerce in India through technology.

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The [Climate Group](#) drives climate action. Fast. Our goal is a world of net zero carbon emissions by 2050, with greater prosperity for all. We focus on systems with the highest emissions and where our networks have the greatest opportunity to drive change. We do this by building large and influential networks and holding organizations accountable, turning their commitments into action. We share what we achieve together to show more organizations what they could do. We are an international non-profit organization, founded in 2004, with offices in London, New Delhi and New York.



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EY is one of the 'Big Four' accounting and management consulting firms with a strong global presence. As a leading advisor to the power & utilities sector, and the upcoming e-mobility sector, EY has worked with almost every major utility in the world, including 9 out of the top 10 Fortune Global 500 utilities. In India, EY has extensively worked in the e-mobility and battery storage space, with leading auto-OEMs, power- and transport-utilities, Government entities such as NITI Aayog, MoP, MNRE, DHI (MoHIPE), think-tanks, charging companies, battery manufacturers and more.



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We Mean Business is a global non-profit coalition working with the world's most influential businesses to take action on climate change. Together we catalyze business leadership to drive policy ambition and accelerate the transition to a low-carbon economy. Our mission is to ensure that the world economy is on track to avoid dangerous climate change by 2020 while delivering sustainable growth and prosperity for all.



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The William and Flora Hewlett Foundation is a nonpartisan, private charitable foundation that advances ideas and supports institutions to promote a better world. The Hewlett Foundation has been investing for a number of years in various strategies to avoid the worst effects of climate change and spare human suffering by reducing greenhouse gas (GHG) emissions. Our grants focus on cleaning up power production, using less oil, using energy more efficiently, preserving forests, addressing non-CO2 greenhouse gases, and financing climate-friendly investments. Our grant making is focused in developed countries with high energy demand and developing countries with fast-growing energy demand.

Endnotes

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AUTHORS

WBCSD: Appurva Appan

Ernst & Young: Kanv Garg, Malay Nigam

World Economic Forum: Jasmeet Khurana

Knowledge Contributors:

Flipkart: Dharashree Panda, Aishwarya Karunakar

To contact WBCSD about this report:

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This report is released in the name of the World Business Council for

Appurva Appan
Senior Associate, Mobility
appan@wbcسد.org

Sustainable Development (WBCSD). This document is the result of a collaborative effort between WBCSD, the Climate Group and Flipkart under WBCSD's REMobility project. The inputs in the report are provided by Flipkart and are obtained from secondary research. It does not mean, however, that every company within the group agrees with every word.

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The pathway is helping businesses achieve their net-zero carbon commitments in line with a +1.5°C scenario by accelerating the adoption of zero-emission vehicles and technologies and improving efficiency through circularity and data-driven mobility solutions. We convene companies from the extended transport value chain and leading organizations in the transport space in an action-oriented agenda and collective advocacy. [Learn more](#)

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The REMobility coalition brings together prominent businesses from the EV ecosystem representing over 10 billion kilometers of mobility in India, who have electrified 250 million annual vehicle kilometers through their own actions. The REMobility in India accelerate the business adoption of electric vehicles, energy storage and renewable energy sources. [Learn more](#)

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Our member companies come from all business sectors and all major economies, representing a combined revenue of more than USD \$8.5 trillion and 19 million employees. Our global network of almost 70 national business councils gives our members unparalleled reach across the globe. Since 1995, WBCSD has been uniquely positioned to work with member companies along and across value chains to deliver impactful business solutions to the most challenging sustainability issues. Together, we are the leading voice of business for sustainability, united by our vision of a world in which 9+ billion people are living well, within planetary boundaries, by mid-century.

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