



CHALLENGES AND SOLUTIONS IN FIRST MILE OPERATION IN DELHIVERY PVT LTD

Arunagiri S¹, Dr. R.Priyadharshini²

¹ Student, Department of Management Studies, School of Management Studies, Vels Institute of Science, Technology and Advanced Studies, Pallavaram, Chennai. arunagirisattanathan@gmail.com

² MBA,M.Phil, Ph.D Assistant Professor and Research Supervisor, Department of Management Studies, School of Management Studies, Vels Institute of Science, Technology and Advanced Studies, Pallavaram, Chennai.

ABSTRACT :

First-mile logistics looks simple on paper: collect goods from sellers and move them into the delivery network. In reality, it is one of the highest-impact stages in logistics performance. The source study on Delhivery shows that delays in pickup, manual manifesting, poor route planning, and weak address visibility reduce productivity, raise fuel consumption, and affect the entire downstream supply chain. The same study also shows that targeted fixes such as GPS-based navigation, automation in the FM app, and selective electric vehicle use can sharply improve efficiency, with EV cost per kilogram dropping to Rs. 0.50–0.63 versus Rs. 0.80–1.44 for diesel alternatives, a reduction of roughly 21 percent to 65 percent depending on the comparison. This article presents those findings in a sharper, percentage-led format designed for easy website publication while still covering the full topic range from the original report.

Introduction

Most logistics failures are noticed at the last mile, but many of them begin much earlier. The Arunagiri study on Delhivery makes a clear argument: first-mile logistics, the stage where goods are picked up from sellers and moved to the nearest processing point, directly affects delivery speed, cost efficiency, pickup accuracy, and customer satisfaction. When the first mile underperforms, the rest of the network absorbs the damage in the form of delayed sorting, lower route productivity, and higher operating cost.

This is exactly why first-mile operations deserve closer attention. In a logistics environment shaped by e-commerce growth, tighter service expectations, and technology-led competition, the first mile is no longer a basic collection task. It is a control point for time, data quality, and cost.

THE INVISIBLE START OF THE SUPPLY CHAIN

First-mile logistics rarely receives the same public attention as last-mile delivery. Customers notice when a parcel arrives late, but they do not see the earlier problems that may have triggered the delay: a pickup rider struggling to locate an address, manual entry of a docket number, communication gaps with the seller, poor route sequencing, inaccurate package data, or the wrong vehicle assigned to the route. These problems are operationally small in isolation, yet together they create a major performance drag.

The source material repeatedly emphasizes that the first mile establishes the foundation for the remaining logistics chain. A delayed pickup reduces sorting efficiency. An incorrect manifest creates downstream data mismatches. A wrong location wastes fuel and driver time. A poorly designed route reduces the number of pickups per day. In this way, first-mile logistics acts as the quality gate for the rest of the network.

For a company like Delhivery, which operates at scale across e-commerce, freight, warehousing, and integrated supply chain services, the first mile is especially critical. The company's ability to manage large shipment volumes depends on disciplined coordination between field operations, digital systems, transport assets, and hub processing. If the network begins with weak data and delayed pickup execution, later stages can only partially compensate.

Why the First Mile Matters More Than It Looks

The source document defines first-mile logistics as the initial stage where goods are collected from sellers or suppliers and transported to warehouses or distribution hubs. It also states that this stage is crucial because it begins the entire supply chain, meaning any delay or error at the pickup stage can affect all later stages of movement.

That makes the first mile the logistics equivalent of a system reset point. If shipment data is wrong, if the pickup is delayed, or if the vehicle takes an inefficient route, the network starts from a weaker position. For a scale-driven company like Delhivery, repeated first-mile inefficiency becomes a structural profitability problem rather than a one-off operational issue.

The Industry Context

The report places Delhivery inside a fast-changing logistics market where transportation, warehousing, inventory management, order processing, distribution, and reverse logistics are increasingly integrated through digital systems. It describes the Indian logistics industry as a sector moving from fragmentation to organization, supported by e-commerce growth, government reforms, and the adoption of technology such as GPS tracking, automated sorting, AI-based planning, and real-time visibility tools.

The document also notes that logistics costs in India account for about 13 percent to 14 percent of GDP, which is higher than in many developed countries. That number matters because it shows why every operational improvement, especially in pickup, route design, and fuel efficiency, has larger economic importance.

Delhivery's Operating Pressure

Delhivery is presented in the study as a leading organized logistics player with services across express parcel delivery, freight transportation, warehousing, fulfillment, reverse logistics, and cross-border movement. The company's performance depends on speed, reliability, accuracy, and customer satisfaction, all of which are highly sensitive to what happens at the first-mile stage.

The report also highlights that Delhivery operates across urban, semi-urban, and rural regions, which means it must manage congestion in metros, moderate infrastructure in Tier-II locations, and lower address standardization in rural areas. This regional diversity increases the importance of route planning, app usability, and pickup discipline.

LIMITATIONS OF EV ADOPTION

The source file does not romanticize EV deployment. It clearly notes practical constraints: lower load capacity than large diesel trucks, limited battery range, insufficient charging infrastructure, and the need for improved route planning. These are important managerial realities.

The recommended approach is therefore selective and hybrid rather than absolute. EVs should be used mainly for short-distance and high-frequency routes. Charging points should be installed at warehouses and hubs. Routes should be optimized to fit battery range. Diesel vehicles should still be used for long-distance transport, while EVs handle suitable urban pickup tasks.

This balanced model is significant because it shows operational maturity. Cost innovation in logistics does not mean replacing every asset with the newest alternative. It means choosing the right vehicle type for the right route pattern and integrating the change into network design.

TECHNOLOGY AS THE BACKBONE OF MODERN PICKUP OPERATIONS

A recurring argument in the source material is that modern logistics is fundamentally technology-driven. GPS tracking, warehouse systems, transportation systems, automated sorting, AI-based analysis, and cloud platforms have changed how logistics companies coordinate high-volume movement. Delhivery is presented as a company that differentiates itself through such technological integration.

In first-mile operations, technology matters in at least five ways:

- It improves route planning and reduces wasted travel.
- It supports real-time visibility and pickup monitoring.
- It reduces manual entry and documentation burdens.
- It improves data accuracy and network synchronization.
- It helps scale operations without proportional growth in inefficiency.

However, the source material also indirectly warns that technology must be aligned with process design. A tool that fails to reduce manual duplication or field-level delay will not create meaningful benefit. This is why solutions such as automatic docket generation and GPS-enabled navigation are so central: they solve real frictions experienced by field teams.

Five Core First-Mile Problems

The Arunagiri study identifies a cluster of repeated first-mile issues that reduce operational efficiency. These are not isolated field-level inconveniences; they are recurring constraints on cost, capacity, and service quality.

1. Pickup Delay

The study notes that delays in pickup operations directly lead to delays in delivery timelines and reduce overall logistics productivity. When a vehicle or associate loses time at early pickup points, every later stop becomes more vulnerable to delay.

2. Address and Navigation Failure

The report states that poor addressing systems and navigation difficulty create major first-mile challenges, especially in Indian operating conditions. In its before-versus-after comparison, manual navigation is associated with high time taken, high fuel usage, fewer pickups per day, and low accuracy, while GPS-based navigation improves each of these factors.

3. Manual Manifesting

A major bottleneck in the study is the FM manifesting process, where LR or docket details are partly handled manually and then re-entered into the app. This adds extra effort, increases error risk, and slows shipment readiness for the rest of the network.

4. Poor Route Planning

The report repeatedly links inefficient route planning to higher travel time, higher fuel use, and lower pickup productivity. In logistics terms, bad routing does not just waste distance; it reduces the number of daily successful pickups that each vehicle and associate can complete.

5. Communication Gaps

The study also highlights poor coordination with sellers and operational communication gaps as a cause of delay and inefficiency. This matters because first-mile logistics depends on timing, shipment readiness, and information accuracy even before the vehicle begins movement.

The Data Signal: Before and After Technology

One of the strongest parts of the report is its comparative interpretation of operations before and after process improvement. In the manual state, navigation quality is low, time taken is high, fuel usage increases, pickups per day decline, and accuracy suffers. After GPS-based improvement, the study records lower travel time, optimized fuel consumption, more pickups per day, and higher accuracy.

The document does not present this as a minor software upgrade. It treats it as a direct productivity intervention. For website readers, the takeaway is simple: better route visibility means faster pickup, lower fuel burn, and more successful daily coverage from the same workforce.

The Cost Story in One Table

The most publishable insight in the study is its cost-per-kilogram comparison between diesel and EV operating models.

Vehicle model	Capacity/Trip	Cost basis	Cost per kg	Key implication
Diesel 407	2500 kg	Rs. 3600 per trip	Rs. 1.44	Highest cost among listed models
Diesel mini truck	1500 kg	Rs. 2600 per trip	Rs. 0.80	Lower than 407 but still fuel-heavy
Piaggio Ape E-xtra EV	500 kg per trip, 2 trips/day	Rs. 15,000/month, about Rs. 500/day	Rs. 0.50	Lowest cost per kg in the model
Bajaj Maxima XL E-Tec EV	500 kg per trip, 2 trips/day	Rs. 19,000/month, about Rs. 633/day	Rs. 0.63	Lower than both diesel options

The report's conclusion from this comparison is direct: EVs reduce cost per kilogram significantly, especially in short-distance and high-frequency logistics operations.

Percentage Reductions That Matter

The source study goes a step further by calculating percentage savings across vehicle combinations. These numbers make the operational argument much sharper.

- Diesel 407 to Piaggio Ape EV: cost per kg falls from Rs. 1.44 to Rs. 0.50, a reduction of about 65 percent.
- Diesel 407 to Bajaj Maxima EV: cost per kg falls from Rs. 1.44 to Rs. 0.63, a reduction of about 56 percent.
- Diesel mini truck to Piaggio Ape EV: cost per kg falls from Rs. 0.80 to Rs. 0.50, a reduction of about 38 percent.
- Diesel mini truck to Bajaj Maxima EV: cost per kg falls from Rs. 0.80 to Rs. 0.63, a reduction of about 21 percent.

These are large savings by logistics standards. Even the weakest improvement in the model, 21 percent, is material. At the high end, a 65 percent reduction can reshape route economics if the route is short, dense, and suitable for EV movement.

What Makes EVs Work

The report explains that EVs work best in short-distance, high-frequency operations where multiple daily trips are possible and fuel cost is a major burden in the diesel model. The proposed EV strategy includes rental-based deployment, two trips per day, and route design aligned to range limits, helping reduce upfront investment while improving cost predictability.

The study also lists several benefits from EV adoption: lower maintenance cost, lower dependence on fuel price fluctuations, multiple trips per day, and better environmental performance. In simple terms, EVs become attractive when route design and operating conditions match the technology.

Where EVs Still Struggle

The Arunagiri document is also realistic about limitations. It states that EVs have lower payload capacity than large diesel trucks, limited battery range for long-distance movement, and depend on charging infrastructure that is not yet available everywhere.

Because of that, the report recommends a hybrid model instead of a total fleet switch. Diesel vehicles remain better for long-distance or heavy-load movement, while EVs are better for short urban or high-frequency first-mile routes.

The FM App Problem

One practical weakness highlighted in the report is the design of the FM application itself. The study specifically points out that manual entry of LR or docket numbers increases workload and error probability, which means the app is not removing enough field friction.

Its recommended fix is straightforward: enable automatic docket number generation during manifesting. The expected gains are lower manual error, less repetitive work, faster manifest completion, easier operation for associates, and stronger process efficiency.

What the Numbers Say About Operations

The report's findings can be translated into a simple performance logic.

Operational factor	Before improvement	After improvement
Navigation	Manual	GPS-based
Time taken	High	Low
Fuel usage	High	Optimized
Pickups per day	Less	More
Accuracy	Low	High
Cost efficiency	Low	High
Productivity	Low	High

This summary is one of the clearest messages for publication. The study shows that better technology and better process design improve multiple performance variables at the same time, not just one.

The Real Strategic Lesson

The deeper message in the source report is that first-mile logistics is a leverage point. Delays at this stage affect delivery time. Poor coordination reduces productivity. Weak route planning raises cost. Manual processes create avoidable errors. High diesel dependence keeps cost per kilogram elevated. Once those factors are corrected, the gains do not stay limited to pickup. Better first-mile execution improves sorting readiness, route continuity, shipment visibility, customer satisfaction, and cost control across the wider network. That is why the study treats first-mile improvement as an operational necessity and a strategic advantage.

PROCESS IMPROVEMENTS RECOMMENDED BY THE STUDY :

The source document points toward several practical interventions that could improve first-mile performance. When assembled into an integrated framework, they form a realistic improvement agenda for Delhivery and similar firms.

1. Automate Manifesting

The strongest process recommendation is the introduction of automatic docket number generation within the app. This reduces repetitive work, lowers entry errors, and speeds up handover.

2. Strengthen GPS-Based Navigation

Replacing manual navigation with GPS-assisted pickup planning can reduce travel time, improve address accuracy, and increase daily pickup counts. This is especially useful in dense urban areas with complex route patterns.

3. Improve Route Optimization

Route planning should account for pickup density, traffic conditions, location clustering, battery range in EV routes, and seller readiness windows. Better planning increases utilization of both labor and vehicles.

4. Standardize Data Capture

Shipment details, addresses, package dimensions, and pickup confirmation steps should be captured through structured digital formats rather than flexible or repeated manual recording.

5. Use a Hybrid Vehicle Strategy

Short-distance, high-frequency pickup routes should increasingly use EVs where feasible, while long-distance and higher-load routes continue to use diesel vehicles. This reduces cost without creating operational mismatch.

6. Reduce Communication Gaps

Pickup scheduling, shipment readiness communication, and escalation systems should be made clearer between sellers, field teams, and hubs to reduce failed or delayed pickups.

STRATEGIC IMPLICATIONS

The central lesson from the source document is that first-mile logistics is not a minor operational sub-process. It is a strategic control point in the performance of a logistics network. Process flaws at this stage affect not only cost but also downstream visibility, service reliability, and customer confidence.

For Delhivery, strong first-mile performance can create advantages in at least four areas:

- Higher asset productivity through better route and vehicle utilization.
- Lower cost through reduced fuel use, fewer manual errors, and better process flow.
- Better customer satisfaction through more reliable shipment initiation and tracking.
- Greater scalability because structured systems allow higher shipment volumes without equivalent growth in inefficiency.

The broader implication is that organized logistics growth in India will increasingly depend on excellence in process design, not only network expansion. As e-commerce deepens and customers expect faster fulfillment, the firms that discipline the first mile will be better positioned to manage the full supply chain.

Five Important Recommendations

The strongest website-ready version of the study's recommendations can be stated in five points.

1. Automate manifesting to cut manual entry and lower error rates.
2. Use GPS-led navigation to reduce travel time and fuel waste.
3. Optimize routes to increase pickups per day from the same workforce.
4. Deploy EVs on short-distance, high-frequency routes where savings can range from 21 percent to 65 percent versus diesel benchmarks.
5. Keep a hybrid fleet model so diesel handles long-distance movement while EVs handle dense urban pickup cycles.

Conclusion :

The Delhivery first-mile study shows that the earliest stage of logistics is also one of the most financially sensitive. Manual navigation, weak address visibility, poor route planning, and manual manifesting reduce speed, accuracy, and capacity, while diesel-heavy route design keeps operating cost high. The most important numeric insight is unmistakable: EV-based first-mile operations can reduce cost per kilogram from Rs. 1.44 to Rs. 0.50 in the best-case model, or by about 65 percent, while even moderate EV comparisons still show savings of 21 percent to 56 percent. Combined with GPS-led routing and app-level automation, that makes first-mile improvement one of the clearest pathways to lower cost and better scale in Indian e-commerce logistics.

BIBLIOGRAPHY :

1. Agatz, N., et al. (2008). *E-commerce logistics challenges*.
2. Hbner, A., et al. (2016). *Logistics challenges in omnichannel retail*.
3. Mangiaracina, R., et al. (2019). *E-commerce distribution network design*.
4. Boysen, N., et al. (2021). *Parcel logistics systems*.
5. Bhattacharya, S., et al. (2018). *Addressing systems in India and logistics impacts*.
6. IARJSET. (2025). *Optimizing first-mile and last-mile operations*. <https://iarjset.com/wp-content/uploads/2025/05/IARJSET.2025.125306.pdf> [web:6]
7. Ethics Group. (2026). *First-mile delivery challenges in India*. <https://ethicsgroup.in/blogs/first-mile-delivery-challenges-india> [web:7]
8. Shiprocket. (2019). *Key challenges in first-mile and last-mile delivery*. <https://www.shiprocket.in/blog/first-mile-and-last-mile-delivery-challenges/> [web:10]
9. Altigreen. (n.d.). *Electric goods vehicles in last-mile delivery*. <https://www.altigreen.com/blog-3/how-is-the-last-mile-ev-adoption-scenario-in-india-and-globally> [web:11]
10. Ecom Digest. (2025). *E-commerce logistics costs: Cut expenses 40% in 2025*. <https://ecomdigest.in/logistics/e-commerce-logistics-costs-minimization/> [web:12]
11. BCG. (2023). *Electric vehicles: Future of last-mile deliveries in India*. <https://www.bcg.com/publications/2023/electric-vehicles-future-of-last-mile-deliveries-in-india> [web:14]
12. Overseas Logistic. (2025). *India's logistics cost now estimated at 7.97% of GDP*. <https://overseaslogistic.com/india-logistics-cost-analysis/> [web:15]
13. EV Mechanica. (2025). *Boosting EV adoption in India's last-mile delivery*. <https://www.evmechanica.com/policy-perspectives-accelerating-ev-adoption-in-last-mile-delivery-in-india/> [web:20]
14. FarEye. (2025). *Last mile costs: 7 ways to reduce it*. <https://fareye.com/resources/blogs/last-mile-delivery-costs> [web:21]
15. Shippy. (2022). *Last mile delivery costs breakdown*. <https://shippy.io/blogs/last-mile-delivery-costs/> [web:22]