Logistics Case Study: Intelligent Last Mile

AVERY DENNISON

Delivering hyper efficiency

Why should the last mile be your first priority?

E-commerce is reshaping global parcel carriers.

The explosive growth in parcel volumes is forecast to reach 256 billion parcels in 2027. This demand strains carriers with heightened expectations for delivery service speed and accuracy, yet they are hindered by operational inefficiencies, a persistent shortage of staff, and often a complex infrastructure of legacy systems and processes.

Why is the last mile the focal point for innovation? It typically accounts for 50% of the supply chain cost.

Getting it right, or wrong, also has the greatest impact on both shipper and recipient satisfaction. Capgemini research indicates 75% of consumers will buy more of a retailer's products if satisfied with its delivery service. The pressure is on carriers to perform.

Global carriers are now rapidly implementing intelligent parcel solutions to bring real-time visibility, accuracy, speed, and efficiency to their operations.

Inside the manual last mile. What goes wrong?

each prone to its own set of inefficiencies. At many last mile facilities the inbound parcels are placed on routing conveyors that distribute them to designated zones. Early in the morning workers manually scan and sort hundreds of parcels per hour placing them in the zone assigned to the delivery vehicle.

This work requires full concentration and precision, and human fatigue and errors are inevitable. These mistakes usually result in parcels ending up on the wrong vehicles; what is known in the industry as load errors. To prevent loading mistakes, some carriers require supervisors to conduct routine spot checks in outbound zones, scanning the barcodes of individual parcels to catch wrong loads before they enter the vehicle. Even so, the manual nature of these processes and high volumes of parcels means that mistakes in loading happen every shift; one in every two delivery vehicles has a wrongly loaded parcel.

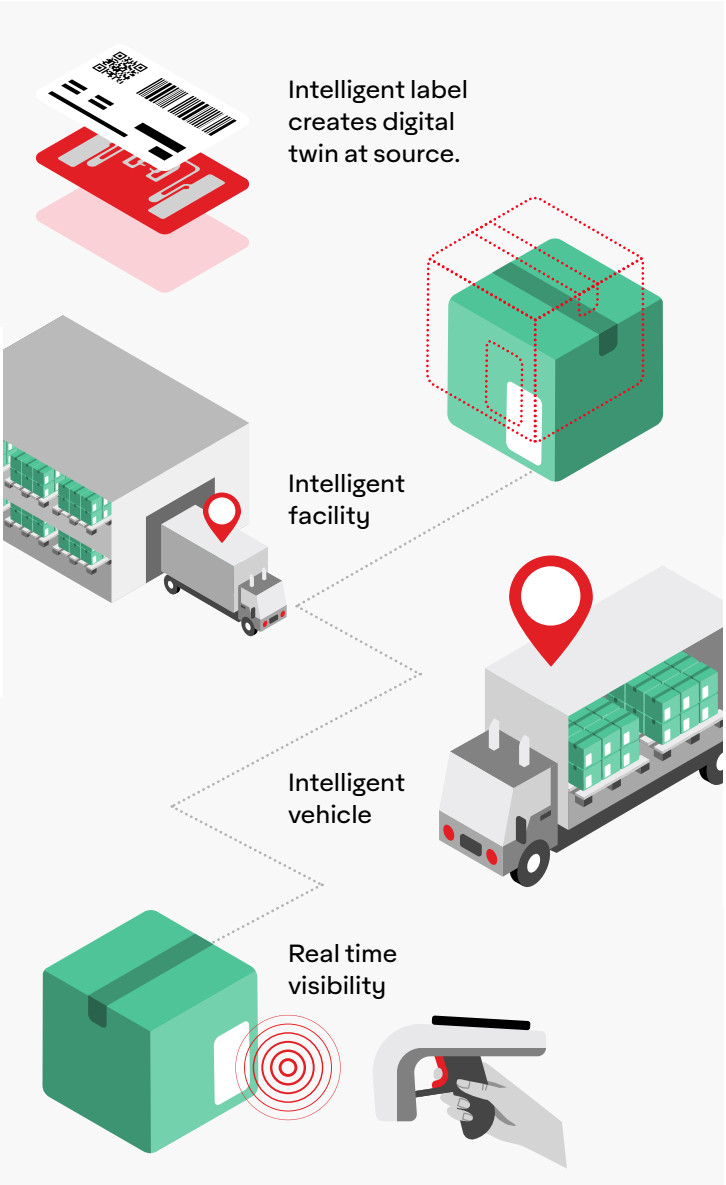
Right package... Wrong vehicle... Why load errors cost millions.

Error loads, while seemingly minor, have a cascading negative impact on the business. Every wrong load needs to return to the facility for re-sorting and re-delivery causing backlogs, delayed shipments, and ultimately eroding trust between shippers and recipients.

“Several factors influence error load costs. These include the scale of the carrier - whether it is an integrator operating on the global level or a smaller regional carrier - as well as network design principles and transportation methods employed. The specific type of loading error the stage at which it is identified and the efficiency of the recovery process all play a significant role in determining the overall cost. Parcels with guaranteed delivery, international consignments, wrong loads at peak season may further complicate and drive up the costs of correcting the error. Error loads result in substantial direct cost of 3 times more that normal and indirect costs such as customer dissatisfaction, potential business loss, driver retention challenges, processing of claims and complaints, and administrative overhead”. Nadja Kurbanova, Solutions Consultant, Avery Dennison

Which technology-driven solutions are carriers implementing to overcome these challenges?

Intelligent Last Mile



Intelligent parcels. The efficiency multiplier.

Forward-thinking carriers are starting to envision a faultless last mile. Faster, more accurate, and much more efficient operations are already operating with some large carriers. A key catalyst is the role of intelligent parcels.

Adding an intelligent RFID label to a parcel opens up a host of digital capabilities - real-time visibility, accuracy, scalability and automation - to the delivery process. With an intelligent label, parcels become a sensor for carriers to monitor process performance, identify ways to optimize, and enhance customer services.

Activating intelligent parcels.

The parcel entering the last mile facility is placed on a conveyor, where a unique intelligent label is applied. From this moment until the parcel end up in the hands of the end recipient, the parcel communicates when scanned, sending detailed data to central management systems.

In the last mile facility scanners can be installed on routing conveyors, in outbound zones and in vehicles, reducing the need for manual scanning.

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Delivered right the first time. Every time.

In the last mile facility the first improvement is a reduction in loading errors. Outbound zones and vehicles can have integrated RF scanners installed, so any parcel being placed in the wrong vehicle is automatically signaled. Vehicles themselves become nodes in a network of continuous data exchange, ensuring that the right packages reach the right destinations efficiently and reliably. Despite these advancements, challenges remain.

Managing peak volumes, maintaining quality at scale, and ensuring consistent RF performance across varied environments are critical hurdles. Yet, as carriers refine these intelligent systems, the promise of an automated, data-driven last mile becomes increasingly tangible, heralding a significant leap towards optimizing logistical operations and meeting the high expectations of customers and end recipients.

Immediate and long term efficiency wins.

The deployment of intelligent logistics solutions has yielded substantial performance improvements for carriers, demonstrating a significant return on investment (ROI) across several key areas. The top three business benefits carriers could realize are:

1. Reducing error loads: Depending on the operation, the implementation of RFID technology can dramatically reduce the rate of load errors by over 70%. This improvement significantly minimizes the costs associated with misdirected deliveries.

2. Increased Productivity: By automating the scanning process, intelligent logistics solutions can eliminate the need for millions of manual scans daily. This automation frees up valuable staff time, allowing for a more efficient loading process and faster dispatch times.

3. Cost Improvements: The precision of intelligent logistics reduces the need for surplus delivery vans, directly lowering fixed operational costs. Moreover, the system's enhanced tracking capabilities ensure an improved chain of custody, automatically documenting the whereabouts of each package, which not only aids in reducing theft and fraud but also optimizes the handling and reimbursement processes for claims.

   The cost savings extend beyond direct operational efficiencies. By streamlining labor and fleet management, reducing load errors, and enhancing the chain of custody logs, carriers see a broad spectrum of financial benefits. Notably, the last mile, which constitutes 42% of the logistics chain cost, sees significant cost reductions.

   The indirect benefits include reduced theft and fraud, lower turnover of staff and partners due to decreased workload stress, and improved overall service quality leading to higher customer satisfaction.

Solution	Solution enables	Investment			Solution outcomes
Sensing-based Network	Replacement of barcode scanning with sensor-based Automated Data Capture	Low	**Medium**	High	Saving millions of manual scans every day
Sortation and Staging Optimization	Efficient and high eprforming sortation and staging process	**Low**	Medium	High	Reduction of “under-the-roof-time” by up to 30 minutes
Parcel Loading with Intelligent Vehicules	Automated verification of loaded packages with a misload warning	Low	**Medium**	High	Up to 80% reduction in misloads
Enhanced Stops	Accurate package identification at every step	**Low**	Medium	High	Reducing every stop by up to 5 seconds

Note: The RFID label applied for the last mile effectively provides all its value on the same day it is applied.
If applied earier in the delivery process, the intelligent label can be leveraged throughout the operation

Intelligent solutions, while pivotal in the last mile, also hold immense potential upstream. If intelligent labels are applied to parcels in the last mile process, they are bringing value only in the last 8 hours of the entire journey. Once shippers pre-tag parcels before pickups, the value multiplier begins. This upstream integration means that packages are already within the intelligent system before entering the last mile facility, streamlining operations right from the start. As tens of millions of packages dwell at various points within the carrier’s network, their integration into this digital ecosystem from earlier touchpoints can drastically reduce the manual effort required in tracking and managing these parcels, amplifying the ROI across the entire network.

The transformative impact of intelligent logistics solutions in reshaping the efficiency and effectiveness of the last mile delivery confirms its position not just as a remedy to present challenges but as a key enabling technology of digital transformation strategies.

Implementing the vision

Implementing advanced logistics technology across thousands of locations might seem daunting, but the process is both swift and streamlined. A pivotal initial step in this transformation is the adoption of intelligent routing systems, where inbound packages are swiftly tagged with intelligent labels as they arrive. These labels contain comprehensive data, including entry points and designated routes, allowing for the seamless sorting of over 100,000 packages per hour. This process not only boosts efficiency but also serves as a robust foundation for the broader implementation of digital solutions.

To address concerns about scale and pace, we can look to successful precedents: as Taylor Johnson, a seasoned client sales expert, notes,

> "We've implemented over 1000 sites in just 24 months."

This rapid rollout is a testament to the scalability and efficiency of our deployment strategies. Moreover, it reassures potential adopters that the transition to a more digitized and automated system can be achieved with minimal disruption and maximum speed.

Identification of Improvements Areas – 1 week	**Feasability Study and Solution Design – 2 weeks**	**Set-up and Piloting – Up to 21 weeks**	**Operational Implementation**	**Support 24/7/365**
Facility survey **1 day**	Feasability study **5 days**	Scoping and planning **3 days**	Integration	24/7 first line support
Process improvement identification **3 days**	Solution design **5 days**	Hardware and Software customization **4-8 weeks**	Implementation	over
Project workshop **1 day**	Stakeholder approval	Pilot **2-12 weeks**	Training	over

Key personnel: Leadership roles in Operations, Quality, Innovation

The last mile – the solution is here already

Intelligent Logistics. The solution is here already.
We encourage lead engineers and operations managers to witness the transformative impact of these solutions firsthand by requesting a proof of concept. This approach not only demystifies the process but also showcases the tangible benefits in real-time, facilitating informed decision-making and swift implementation.

Download the full report here

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