Wiliot's Shipping & Receiving Intelligence Solution for Post & Parcel

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EXECUTIVE SUMMARY

The post & parcel supply chain is plagued by challenges such as maintaining visibility over parcel location and condition during transit, especially when it requires multiple handoffs. Managing delivery efficiency, while adapting to fluctuating demand and last-mile complexities, can strain operational resources and impact delivery reliability. Reusable Transport Items (RTIs) play a critical role in moving goods throughout the supply chain, but they often go missing or end up in the wrong locations. This can cause further complications such as shrinkage, delays, and operational inefficiencies.

Ambient Internet of Things (IoT) is a technology that enables most items in a supply chain to be connected to the Internet, delivering real-time triggers and information about location and condition at a minimal cost, using low-cost wireless infrastructure, without human intervention.

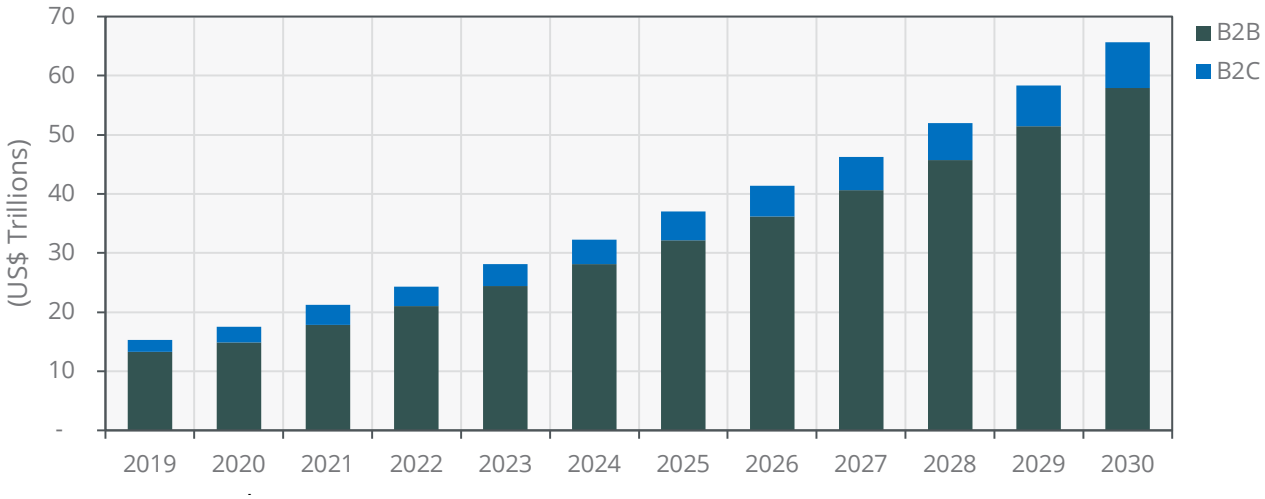
This brief examines the effects of the introduction of ambient IoT in the post & parcel supply chain. It aims to identify specific use cases and benefits that can lead to optimized operational efficiencies.

CHALLENGES IN THE POST & PARCEL SUPPLY CHAIN

Rapid E-Commerce Growth

The 2020s have been the decade of rapid e-commerce growth so far with e-commerce growing to US$32.2 trillion, with more than 14% Year-over-Year (YoY) growth. This has intensified the need for end-to-end tracking as supply chains work to handle increased shipment volumes and consumer expectations. As e-commerce expands globally, cross-border shipping requires more detailed tracking to ensure customs compliance, timely deliveries, and security. Additionally, the surge in same-day and next-day delivery has pushed parcel companies to adopt tracking solutions to optimize operations and meet tight delivery windows.

E-Commerce Revenue



Sources: ABI Research; ITA

Regulatory Pressure

Regulatory pressures in the post & parcel industry are increasingly demanding end-to-end tracking to ensure transparency and security with deliveries. Regulatory bodies, particularly in the European Union (EU), such as Regulation (EU) 2018/644, require comprehensive tracking to prevent fraud and theft, and to enhance consumer data protection. Cross-border shipments especially are at risk of facing increased scrutiny due to customs compliance and security concerns.

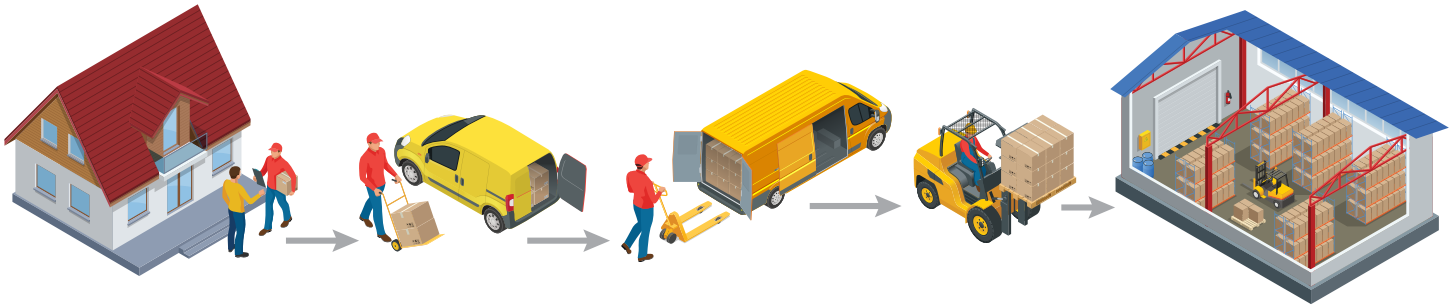
Visibility and Tracking of Deliveries

Today, customers expect accurate and constant updates on their delivery status, choosing the most transparent courier service. This makes the need for real-time delivery tracking software critical. The reliability and granularity of tracking information is becoming a deciding factor in consumers' choice of delivery company.

Returns and Convenient Access Points

The rise of reverse logistics, driven by increasing returns from e-commerce purchases, has amplified the need for end-to-end tracking in the post & parcel industry. Consumers expect a seamless return process with real-time tracking, from drop-off to refund. This puts pressure on enterprises, as well as logistics providers, to offer detailed visibility throughout. Although convenient access points, such as parcel lockers and collection hubs, are becoming vital in facilitating easy returns, this still requires robust tracking systems to manage inventory and streamline operations.

Reverse Logistics Supply Chain

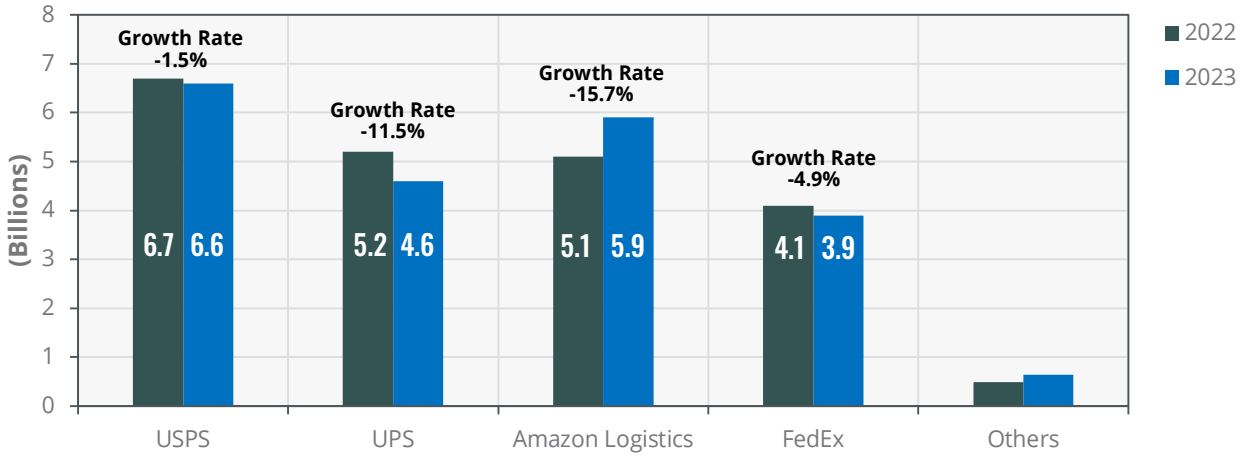


Competition of Dedicated Parcel Carriers

Competition from new-age dedicated parcel carriers that are vertically integrated, like Amazon and Alibaba, has reshaped logistics in several ways. By controlling their entire logistics chain from warehousing to final delivery, these tech giants have redefined industry benchmarks for speed and reliability, increasing efficiency and reducing costs due to economies of scale.

Due to their tech background, they also have an edge in leveraging cutting-edge technologies such as Artificial Intelligence (AI), automation, robotics, and data analytics to optimize delivery routes, reduce costs, and improve tracking accuracy. They have developed their own end-to-end logistics systems, reducing reliance on traditional carriers and offering faster, more reliable delivery services. Given their vast global networks and infrastructure, these companies can handle cross-border shipments with relative ease. Compared to this, traditional parcel carriers are being outcompeted on both price and delivery speed.

US Carrier Parcel Volume



Source: Pitney Bowes

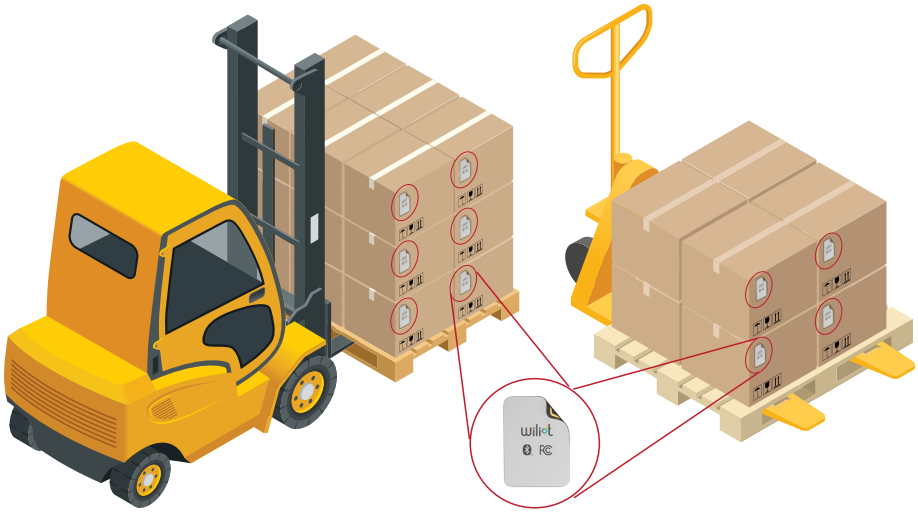
Declining Post & Parcel Volume

As a result of dedicated parcel carriers, conventional post & parcel carriers have taken a hit, which can be seen in the graph above. Last year, the total United States Postal Service (USPS) inbound international volume decreased by 74% over the past 5 fiscal years, while outbound international volume fell 38% over the same period. Increased competition, new international supply chain models, and higher prices for lightweight postal products all contributed to the decline. On a broader level, there is a need for advanced sorting technologies. A majority of Third-Party Logistics (3PL) warehouses reported that once they reach 80% to 85% space utilization, their efficiency drops and labor makes up a major portion of their total costs. There is a need for carriers to be more efficient and look into alternative sorting and tracking technologies to ensure customer satisfaction.

Lost RTIs

The loss of returnable assets, such as pallets, roll cages, containers, and totes, is a growing challenge in the post & parcel industry. It contributes to increasing operational costs, directly impacting profit margins. In addition, the loss of critical returnable assets can impact resource allocation and cause delays in shipments, especially for industries reliant on reusable containers, harming the carrier's ability to meet customer expectations. Not being able to track RTIs often results in higher operational costs, constantly needing to replace lost assets, effectively shifting RTIs from a Capital Expenditure (CAPEX) to an Operational Expenditure (OPEX). This problem is further compounded by the vast volume of RTIs in circulation, making manual tracking methods inadequate and error prone.

An estimated US$800 million to US$1.5 billion containers are missing annually. Their replacement alone remains a huge issue globally. Even after several record-keeping systems, the leakage somehow remains due to a lack of proper visibility. Merely adding an extra budget for lost containers every year is not going to solve the problem in the long run.



WILIOT'S TECHNOLOGY

Addressing post & parcel supply chain challenges requires both visibility and data sharing. In many cases, postal carriers have siloed Enterprise Resource Planning (ERP) systems, faulty asset tracking solutions, minimal data analysis capabilities, and manual stock management processes that are exposed to human error.

Ambient IoT is a solution that can directly resolve these current limitations in the post & parcel supply chain, offering autonomous, granular, and real-time tracking of stock as it moves from the origin to its destination. Wiliot, a leading provider of ambient IoT, offers a complete shipping & receiving intelligence solution for parcel carriers and 3PL providers at the loading dock, not only providing the technology to digitalize packages and assets, but also to ingest and process these data in the most seamless way possible.

The Wiliot Ambient Data Platform at a glance:

- IoT Pixels (Bluetooth® stickers) are battery-free stickers that can be applied to shipping labels, pallets, and RTIs.
- Bluetooth®-based network devices are installed at outbound and inbound docks that energize the Pixels to relay their sensing and location data.
- Data from IoT Pixels are fed into Wiliot's cloud-based Ambient Intelligence Platform that utilizes Machine Learning (ML) for data analysis, as well as management of devices and connections to ERP or Warehouse Management System (WMS) solutions.

IoT Pixels Placed at the Carrier Facility

USE CASE	BENEFIT
Reusable Asset Management	Monitor the movement of RTIs, without scans, for a real-time and dynamic view of asset inventory in each location. Automatically identify which locations have a surplus, and which are at risk of running out, to ensure shipments are never halted. Reduce asset shrinkage with last-seen location insights to pinpoint problem areas.
Real-Time Inventory Confirmation	Lots are no longer scanned manually upon delivery. Wiliot's platform automatically detects and validates which items were received, rather than assumed receipts based on expected shipment inventories, to ensure inventories are correct and alert to any discrepancies.
Workflow Alerts	Eliminate mis-loads and mis-deliveries before they happen with real-time alerts for shipments loaded onto the wrong trucks, or delivered to the wrong locations. Automatically file claims for items missing from shipments based on what was actually received.
Condition Monitoring	Real-time temperature alerts notify staff when perishable shipments are left idle during loading and unloading, ensuring dwell times and temperature exposure stay within acceptable limits. Reduce product quality degradation and prevent temperature excursions with visibility into environmental conditions with an asset- and package-level granularity.
Vehicle Utilization	Real-time data from IoT PIXELS allow logistics providers to optimize delivery routes and ensure vehicles are fully loaded before leaving the dock, reducing the total number of trips, and in turn, lowering shipping costs with fewer emissions and less fuel.

IMPLEMENTATION RECOMMENDATIONS

- **Look into Integrating IoT Data with Existing Management Systems:** Aim to move your WMS from on-premises to the cloud to ensure seamless integration between IoT-generated data and your current systems. This will enhance granular real-time decision-making capabilities, enable predictive analytics, and fostering a culture of proactive issue resolution.
- **Prioritize Strengthening Network Infrastructure:** Establish a robust network infrastructure that supports continuous transmission of ambient IoT data. This could include expanding the use of Long Term Evolution (LTE)/5G networks, LoRaWAN, or mesh networks to maintain strong connectivity, especially in outdoor environments or high-density areas.
- **Consider Security and Data Privacy:** Implementers need to develop strong data encryption protocols and compliance with local/federal data privacy regulations when transmitting parcel information. Security measures need to be implemented to prevent data breaches and unauthorized access, safeguarding both customer and business data.
- **Budgeting and Cost Analysis:** Carriers should initially look into breaking costs down into hardware, software, integration, and maintenance. This includes tags, readers, network infrastructure (e.g., gateways or cloud services), and any platform for data management. Starting with a pilot project in a single store or across a specific section of the supply chain allows carriers to assess the effectiveness and scale up based on initial results.
- **Focus on Quick Wins:** Some use cases have a higher priority than others. While there are many use cases that enterprises may want to address with supply chain visibility, companies need to prioritize according to their internal resources. The priority for carriers should be on use cases that can help gain quick wins. Applying IoT Pixels in crates and pallets to minimize the loss of returnable assets could be an impactful start.

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About the Sponsor

Wiliot is a company engaged in the design and development of ambient IoT and ambient intelligence products. Wiliot's Ambient Intelligence Platform brings the physical world online using IoT Pixels, battery-free smart tags that push data to the cloud, via Bluetooth®, in real time without relying on manual labor or scans. Wiliot's mission is to add intelligence and automation to products, packaging, and transport assets—enabling responsive, dynamic supply chains.

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