

# Knock, Knock: Autonomous Last-Mile Delivery is Here, But Is it Ready to Scale?



**JABIL**

Whether you need to soothe a late-night snack craving or find yourself missing a critical tool in the middle of a home improvement project, delivery services and apps can bring just about anything directly to your door in a matter of hours — if not minutes.

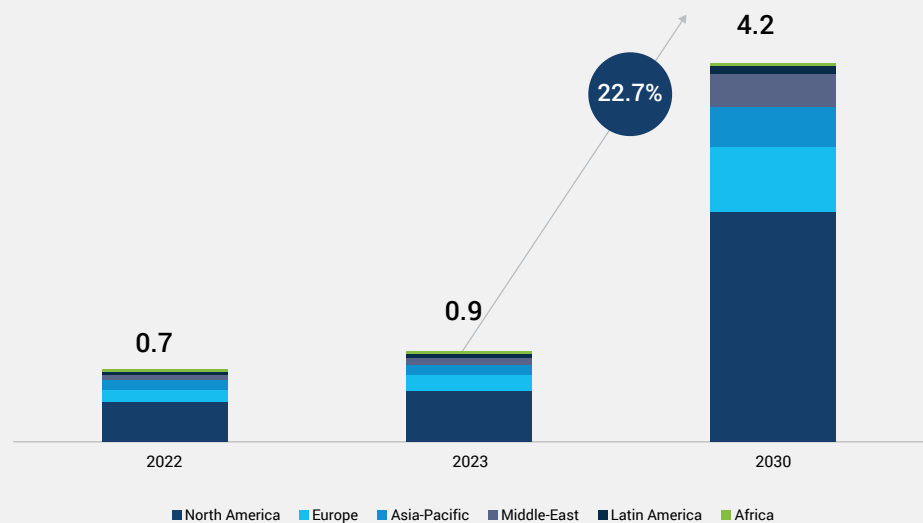
This exponential growth of on-demand delivery has put a strain on companies' last-mile logistics capabilities from both a labor and transportation perspective. Autonomous mobile robots (AMRs) and delivery drones are moving fast from experiments to active deployments. Sidewalk robots are delivering meals and groceries across campuses and neighborhoods; drones are ferrying medical kits and lightweight parcels where roads are slow or congested.

The market for autonomous last-mile delivery is expanding rapidly: it is projected to grow at a **23% compound annual growth rate** (CAGR) through 2030 to reach more than \$4 billion, driven by the demand for quick, contactless delivery kicked off by the COVID-19 pandemic.

# \$4.2B

Autonomous  
Last-Mile Delivery  
Market 2030  
(projected)

Source: Markets and Markets



For OEMs building these systems and their retail partners, developing automated technology is no longer the core hurdle. The ability to produce durable, compliant, serviceable hardware at scale, on cost, and with predictable supply chains — all while managing a patchwork of regulations across geographies — is the next frontier in last-mile delivery.

# Why Autonomous Last-Mile Delivery Is Accelerating Now

Multiple structural forces have converged to make autonomous last-mile delivery commercially attractive and operationally urgent for businesses, logistics partners, and companies in between, including third-party delivery apps like Uber Eats and DoorDash.

## 1. Growing e-commerce volumes and delivery expectations

Roughly **400 billion packages** shipped worldwide in 2025, with nearly 500 billion expected to ship in 2028. That volume growth, plus consumer demand for near-instant delivery, is squeezing traditional last-mile networks. Automation and alternative delivery modes like drones can help retailers and operators make high-frequency, short-range deliveries cost effective to meet customer expectations.

## 2. Shifting demands from time-critical industries

While some deliveries can sit on a truck for an hours-long journey to the customer's doorstep, items like fresh food and medication require a timelier drop-off.

Restaurants in particular face volatile, heavy demand at peak mealtimes and from standalone delivery marketplaces or ghost kitchens. Autonomous delivery robots are particularly attractive for these businesses; short routes, small thermal payloads, and a high number of trips make robots a cost-effective, reliable complement to couriers. According to the **National Restaurant Association**, 75% of customers want technology options when ordering delivery from a restaurant, making this an important area of consideration for business owners. Companies like **Serve Robotics** (formerly part of Uber) and **Otonomy**, already active in restaurant-dense corridors and controlled environments such as airports, are proving that small sidewalk AMRs can reduce delivery costs and bottlenecks while maintaining consistency and safety.

In other critical industries like healthcare, drones and unmanned aerial vehicles (UAVs) have demonstrated a clear ROI in last-mile. For example, **Zipline's** delivery of blood, vaccine, and other critical medical supplies in Rwanda and expanding contracts in other regions demonstrate that drones can help quickly reach rural areas and reduce waste while improving patient outcomes. Such mission-critical wins attract government and NGO funding that accelerates the scaling of similar automated delivery projects.

## 3. The bottom line: Costs, labor constraints, and sustainability

Last-mile delivery is expensive — **more than half** of a shipment's total logistics cost. Persistent driver shortages and wage pressure raise operating costs for traditional delivery fleets. Additionally, **Accenture** reports that greenhouse gas emissions from urban delivery traffic could grow 32% by 2030.

Automation addresses all three problems, requiring fewer couriers and delivery drivers while reducing the fuel used by trucks and cars — **reducing delivery costs in cities** by up to 40% and strengthening the business case for delivery automation. The next step, of course, is scaling AMRs, personal delivery devices (PDDs), and drones to truly reinvent last-mile delivery.



# 75%

OF CUSTOMERS

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FROM A RESTAURANT

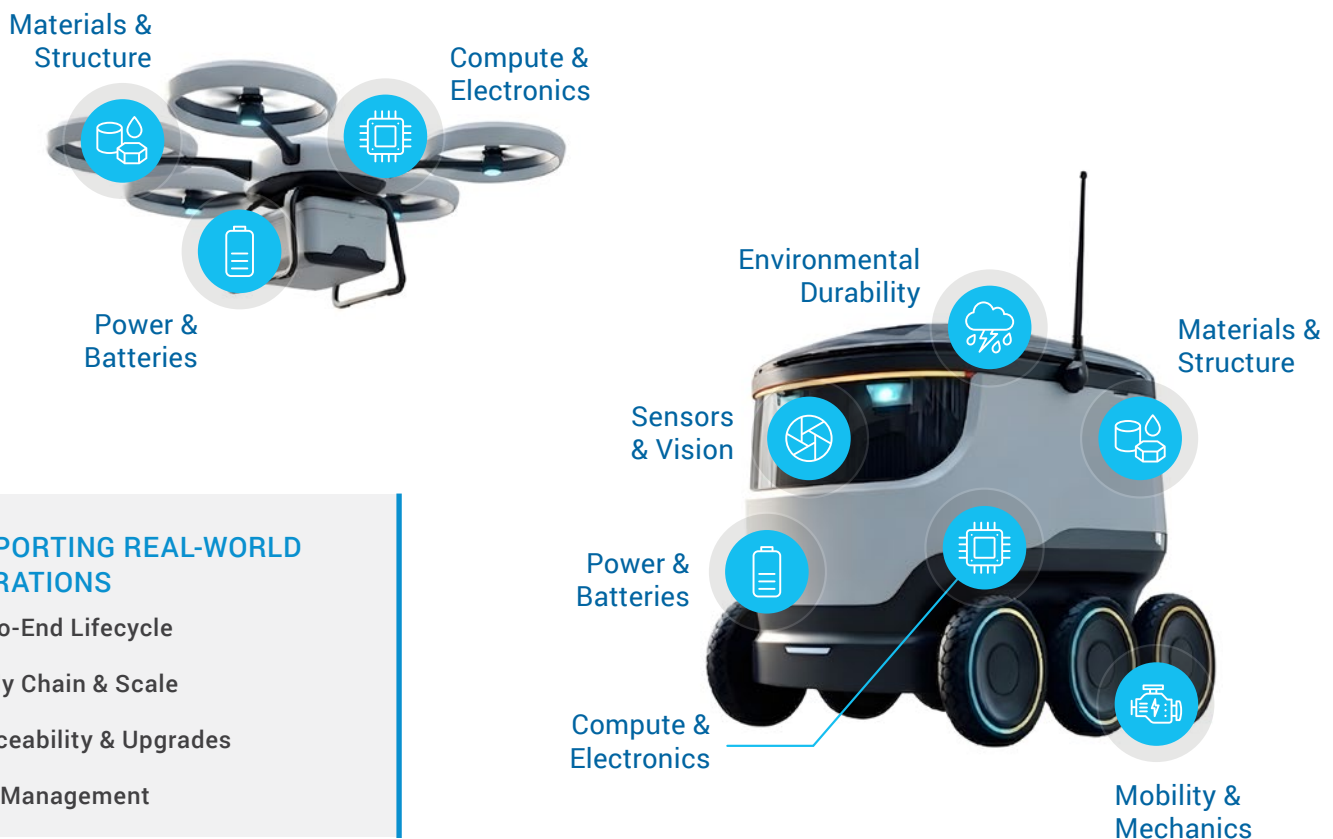
# Why Scaling Last-Mile Delivery Automation Remains the Core Challenge

Many companies have proven the possibilities of autonomous last-mile delivery in pilots. Fewer have proven manufacturing at scale.

For one, these vehicles require **complex, ruggedized hardware**. AMRs and drones combine high-precision sensors, compute, power systems, structural composites, and electromechanical actuators in compact packages. These must survive unpredictable weather, vibration, dust, washdowns, and repeated impacts from daily use in the street or sky. Designing a bot for a somewhat controlled indoor warehouse is different from designing for five years of daily outdoor service.

In the design phase, it's common to see AMR and drone prototypes with bespoke assemblies and tight tolerances that are expensive or slow to assemble. Scaling the production of these vehicles requires **Design for Manufacturability (DfM)** work up front to accelerate their production readiness. Consolidating parts, using standard fasteners, and integrating modular subassemblies helps **reduce cycle time, reduce defect variance, and make field service predictable**.

At scale, autonomous delivery shifts from a robotics problem to a lifecycle engineering challenge. Vehicles must be designed to be manufactured, deployed, serviced, upgraded, and supported over years of continuous operation. This requires early consideration of factors that are often invisible in pilot programs but decisive when robots are deployed at scale, like serviceability, supply chain resilience, environmental durability, and fleet-level management.



## SUPPORTING REAL-WORLD OPERATIONS

End-to-End Lifecycle

Supply Chain & Scale

Serviceability & Upgrades

Fleet Management

For additional information, visit [jabil.com/industries/digital-commerce-robotics](https://jabil.com/industries/digital-commerce-robotics)

Supply chain management can also be a limitation to OEMs. Specialty components like sensors (including LiDAR and SWIR or ToF cameras); battery packs and battery management systems; lightweight composites; motors with precise torque curves; and certified avionics all **require suppliers who can deliver consistent quality at volume**. Any constraint in vehicle's supply chain can quickly stall a production ramp.

This is particularly true at fleet scale, when supply chain performance becomes as critical as vehicle performance. Autonomous delivery platforms depend on multi-supplier ecosystems spanning sensors, batteries, compute, and mechanical subsystems. Designing for availability, redundancy, and long-term continuity — not just cost — is essential to avoid production bottlenecks and support sustained growth across regions and customers.

OEMs also have regulatory and certification hurdles to overcome, particularly for drones. Drones face **airspace rules around operation beyond the visual line of sight (BVLoS)** plus **redundancy and safety requirements** that influence hardware design. For example, a **proposed U.S. Federal Aviation Administration (FAA)** regulation would require drones to have a backup power source onboard to fly BVLoS.

Furthermore, there are no set global standards for drone operation. Market regulations are being actively determined by civil aviation bodies around the world, so OEMs might face one set of rules in one region and a completely different set in another. Manufacturers must build **validation, documentation, and traceability** into their production processes from the start to meet the regulatory standards needed for operation in all the end markets they serve.

Still, these are manufacturing problems — solvable, but only if OEMs partner with a manufacturing solutions provider who understand both high-precision mechatronics and regulated production.



## HOW EFFECTIVE LAST-MILE DELIVERY IMPROVES BRAND PERFORMANCE

When executed well, autonomous last-mile delivery yields measurable brand outcomes:

### Faster SLA and higher customer satisfaction

Shorter, more consistent delivery windows increase repeat purchase and reduce complaints. A study from **Digital Commerce 360** found that delivery is a key part of brand loyalty for 98% of customers.

### Expanded coverage and new revenue windows

Drones can open rural and hard-to-reach corridors for rapid fulfillment; autonomous delivery robots can cost-effectively extend a restaurant's delivery radius without increasing courier headcount.

### Lower marginal delivery cost at scale

While unit economics depend on density and utilization, properly designed AMR or drone delivery fleets reduce cost per stop over human couriers as scale increases, particularly on high-frequency short trips.

### Sustainability credentials

Battery-powered fleets reduce urban tailpipe emissions and support corporate environmental goals — an increasingly visible brand differentiator.

## How Jabil Enables Last-Mile for Leading Brands

Jabil's deep robotics experience, advanced manufacturing capabilities, and global, digitally connected supply chain address the full stack of challenges that determine if autonomous delivery systems can survive real-world conditions and operate reliably at fleet scale.

Jabil's approach to last-mile automation is shaped by years of building and operating intelligent automation in demanding, real-world environments. Across its global manufacturing network, Jabil deploys more than 25,000 robots and supports them with 2,000+ automation engineers and technicians. Our teams are also deeply experienced in developing warehouse robotics like automated guided vehicles (AGVs), automated storage and retrieval systems (ASRS), and even humanoids for leading brands. This operational exposure informs how Jabil works with customers as an industrialization partner focused on long-term performance in the field rather than short-term pilot success.

For autonomous mobile delivery robots, Jabil helps OEMs **transition from rugged prototypes to scalable platforms** designed for outdoor, high-duty-cycle operation. Jabil supports AMR development with early **Design for Manufacturability (DfM) and Design for Reliability (DfR)** engagement, helping simplify assemblies, reduce part counts, and standardize components without compromising autonomy performance or payload requirements. These efforts are critical for **shortening time-to-production, reaching the market faster, and improving serviceability** once fleets are deployed at scale.

Jabil specializes in **precision electromechanical assembly, sensor and camera integration, and repeatable processes** — core requirements for autonomous delivery robots navigating complex pedestrian spaces. **Automated optical inspection, machine-vision systems, and in-line functional testing** are embedded directly into production flows, ensuring consistent sensor alignment, drive-system performance, and system integrity across every unit. **Predictive analytics and AI-enabled monitoring** across Jabil's global manufacturing footprint continuously assess process health, allowing teams to identify quality drift early and correct it before it impacts fleet reliability.

Similarly, Jabil supports drone and UAV manufacturers across the full system architecture, from **lightweighting structures to integrating advanced sensing and power management** technologies.

Jabil's materials engineering and manufacturing teams work closely with OEMs to optimize drone structures for size, weight, and power through:



Jabil brings extensive experience in power management, integrating **high-density battery systems, battery management electronics, and thermal controls** — essential capabilities for extending flight range, improving endurance, and meeting redundancy requirements for regulated operations. These same capabilities also support the development of broader **ground infrastructure needed for scaled drone delivery**, including charging stations, docking systems, and fleet-support hardware.



Our teams' expertise in optics and sensor integration enables drone and AMR OEMs to reliably manufacture complex perception stacks at volume. **Precision assembly of cameras, LiDAR, radar, infrared, and SWIR-based sensing systems** — combined with rigorous alignment and validation — ensures that the performance achieved in testing translates into consistent real-world operation.

Underpinning all of this is Jabil's global, digitally connected manufacturing backbone. Our 100+ sites in more than 25 countries are linked through a unified data and analytics platform that provides real-time visibility into quality, yield, and performance across regions. AI-driven insights support predictive maintenance, yield optimization, and faster replication of validated manufacturing processes from one site to another. For last-mile delivery OEMs, this means production can scale geographically without sacrificing consistency.



## A Capable, Trusted Partner for Next-Gen Last-Mile Delivery

Autonomous delivery robots and drones are solving real last-mile problems across retail, restaurants, and healthcare. The remaining question is scale:

### **BUILDING**

reliable supply chains

### **DESIGNING**

for manufacturability

### **ENSURING**

regulated production

### **CREATING**

scalable test and service ecosystems

Jabil's practical, product-level capabilities and regulated manufacturing experience can accelerate that journey, helping delivery innovators move from pilot fleets to trusted infrastructure.