



THE SUSTAINABLE LAST MILE. FASTER. CHEAPER. GREENER.





Something unexpected happened to last-mile delivery during the pandemic—it got greener. With many people stuck at home, e-commerce sales skyrocketed.¹ When supply chains started moving again, the ecosystem adapted fast, as people purchased more and different products online. Stores became fulfilment centres. Ship from store and curbside pickup emerged. Parcel drop density rose.

Out of sheer necessity, new consumer behaviours and retailers' responses to them changed last mile delivery's carbon footprint, making it more sustainable. But these sustainability gains are only the beginning of a whole new opportunity for collaboration. One that could produce a remarkably more sustainable last mile. But only with action and smart investment.

So what happens next?

The carbon footprint of the last mile has long been an environmental and societal challenge. The sustainability gains that came from the pandemic were unintentional. Yet they happened at an ideal time.

Now it's time to get intentional and make the last mile more efficient, less expensive and more eco-friendly. The imperative to act is clear.

Last-mile delivery accounts for 53% of the total cost of shipping—and 41% of total supply chain costs.² With no interventions, we can expect a 32% jump in carbon emissions from urban delivery traffic by 2030.³ Consumers are watching. They have a tall order: convenience, speed and sustainability at the right price.



A tipping point

Lasting change will require bold moves such as incentivising greener choices among consumers and businesses, rethinking asset use, and harnessing data and analytics. The whole last-mile ecosystem—post and parcel organisations, retailers, delivery companies, governments and consumers—is at a tipping point. Go one way, and it can create a truly sustainable last mile—faster, cheaper and greener. Go the other way, and things worsen unchecked.

No single entity can solve this problem alone. It will take all ecosystem players working together in ways they never have before.

The potential of local fulfilment

The acceleration of local or market-based fulfilment is one stand-out impact of the pandemic. Amazon is a pioneer here. The company's ability to meet its Prime delivery promises has always hinged on its innovative local fulfilment strategy. And in March 2020, the e-commerce giant doubled down on its local delivery strategy, investing in a network of new micro-fulfilment centres located even closer to its customers that stock "need it today" items. The goal was to offer more speed and convenience with a lower carbon footprint.⁴

To respond to Amazon's delivery speed and cost, brick-and-mortar retailers had already been developing capabilities for omnichannel fulfilment using their stores or other local inventory options. The pandemic radically accelerated fulfil-from-store investments by about three to five years,⁵ permanently altering supply chains where inventory is placed closer to customers than ever before.

Retailers accelerated these investments as they scrambled to adapt. But these investments won't be rolled back post-pandemic. Now, many more items will come from market-based inventory, which creates an opportunity for new experiences around local fulfilment for consumers and exciting potential for post and parcel and logistics organisations to create a more sustainable last mile.

To understand this potential, in 2020 Accenture and Frontier Economics developed a robust economic model of the impact of local fulfilment centres for e-commerce using data from London, Chicago, and Sydney.⁶

The model estimates the impact on outputs such as emissions and traffic congestion, based on inputs including local fulfilment centre prevalence, population density, average distance travelled per parcel, delivery vehicle mix and consumer demand projections.

The potential of local fulfilment

The analysis is revealing.

The last-mile supply chain made possible by local fulfilment centres could lower last-mile emissions between 17 and 26% by 2025.

This improvement is broadly consistent across all three cities. Using local fulfilment for even half of e-commerce orders between 2020 and 2025 could lead to significant impacts:

Chicago

13%

decrease in delivery traffic, saving **68k tonnes** in carbon emissions (approximately 20% of delivery van emissions)

London

13%

decrease in delivery traffic, saving **144k tonnes** in carbon emissions (approximately 17% of delivery van emissions)

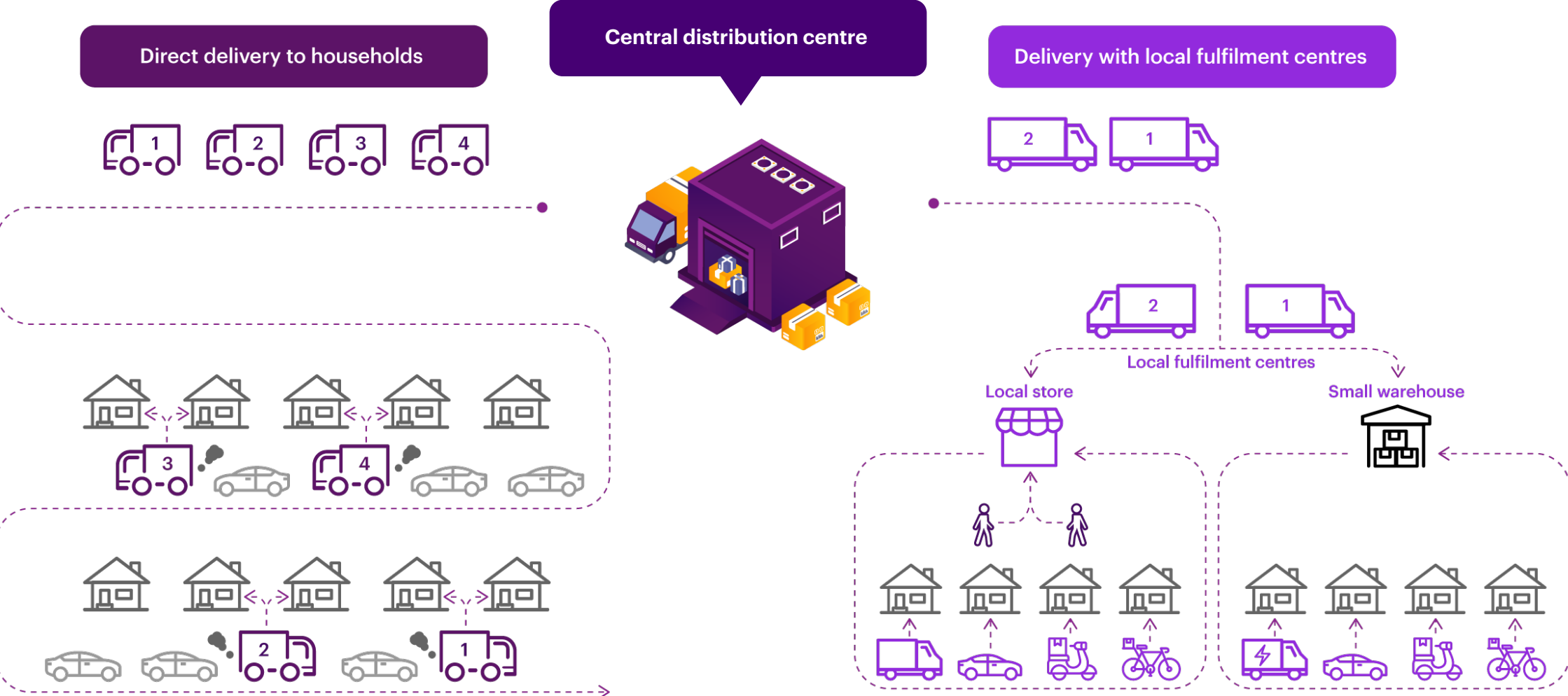
Sydney

2%

decrease in delivery traffic, saving **52k tonnes** in carbon emissions (approximately 16% of delivery van emissions)

Local fulfilment: Same distance. Smaller footprint.

The last-mile supply chain made possible by local fulfilment centres could lower last-mile emissions between 17 and 26% by 2025. Using local fulfilment for even half of ecommerce orders between 2020 and 2025 could lead to significant impacts.



Going the extra mile for a greener last mile

The last mile is not going to get greener with more investments in traditional processing and distribution infrastructure and delivery fleets.

This is about thinking outside the box to deliver the box. It's critical to work across the ecosystem to understand the unseen costs of last-mile delivery and pursue change. This means investing smartly in innovative technologies and balancing high- and low-impact opportunities. Three fundamentals are key to any plan, and success involves coordinated investment and creative—even unconventional—ecosystem cooperation.



3 fundamentals for the last-mile ecosystem to create a more sustainable last mile

01 Incentivise
greener
choices

02 Rethink
asset
use

03 Harness
data and
analytics

01

Incentivise greener choices

Develop incentives and “choice architectures” that encourage consumers to receive deliveries in more sustainable—yet convenient—ways, and ecosystem players to make green investments.

01 Incentivise greener choices

Making purchases online can be as easy as clicking a button and finding the package at your front door an hour later. It's so easy that people don't think about how the shipping option they select, the size of their basket or where, when and how their order is fulfilled impacts the environment.

The root issue here is lack of buyer awareness. It's why the last-mile ecosystem must make consumers more aware of the environmental impact of delivery options and be more transparent by offering greener delivery choices at checkout. Many people would choose these greener options—**43% of consumers are more likely to choose retailers that offer more sustainable delivery options.**⁹ These “choice architectures” run the gamut from green shipping buttons to GHG calculators to consolidating multiple individual deliveries into one. There are also options to incentivise consumers to pick up parcels at local fulfilment centres by offering value-add experiences or discounts. **In our model, if all customers within 1 kilometer of a fulfilment centre were to collect their deliveries on foot, 14% of London's deliveries would have a zero-emission last mile.** The message is clear: sustainability doesn't have to come at the cost of customer experience, or with a higher price tag.

Getting to green

Shopify's Carbon Checkout App

allows consumers to make choices based on their values. They can balance the carbon footprint of their orders by rounding up purchases to the nearest dollar. The difference is pooled to fund projects that reduce global carbon emissions. It happens seamlessly at checkout—for every dollar contributed, 245 lbs. of carbon emissions are offset.⁷

Cainiao Smart Logistics Network

— which is Alibaba Group's logistics unit—is locating 30,000 new postal stations in convenient spots across 100 cities in China. The posts support easy, contactless mailing and parcel collection, have services for consumers to track their packages in real time, and use autonomous vehicles to bring parcels to the door step.⁸



01 Incentivise greener choices

Incentivising greener choices doesn't just extend to consumers. City and national governments and planners must weigh the trade-offs they can make to incentivise delivery companies to invest in greener fleets, enable the circular economy and develop greener route management practices. **In our model, the use of low-emissions vehicles accounted for 51% of the total decrease in London's delivery van emissions from 2020 to 2025.**

Delivery companies are already investing in electric vehicles. Cities can incentivise further

action by investing in electric vehicle charging infrastructure, making them convenient for delivery companies. They can also offer GOV (green occupancy vehicle) driving lanes, express parking, ticketing and toll exemptions, or carbon credits for green vehicles.

All of these are appealing because in a delivery company's calculus, the inherent efficiency gains of fast, easy access to urban addresses could offset the incremental cost increases of investing in green vehicles.

02

Rethink asset use

Repurpose, retrofit and share assets like stores, infrastructure and fleets—while investing in green technology and evolving regulations to support these innovative approaches.

02

Rethink asset use

Assets have a fixed role in the traditional last mile. Warehouses and fulfilment centres store the inventory. Delivery fleets run the routes. Every delivery organisation invests in its own infrastructure, technology, people and vehicles. But as the context of the last mile changes—more volume, more velocity and new consumer expectations—it's time to stop building redundant networks and start repurposing assets with sustainability as a priority.

Retailers have been reinventing their best asset—the physical store—for years amid the e-commerce boom. Pandemic lockdowns that kept shoppers at home created new challenges, closing stores. But retailers have and continue to repurpose stores into local fulfilment centres, transforming them into omnichannel fulfilment hubs. These are hybrid spaces for shopping, collecting and returning deliveries. In a shared use model, dying shopping malls—and other unused or underused urban spaces—can become multi-tenant fulfilment hubs. Bringing new life to such spaces can generate income for towns, cities and local authorities while enabling the sustainable last mile. Making it a reality demands supportive zoning, tax incentives and creative city planning.

Getting to green

The 2020 holiday season looked very different for US retailer Target.

The retail giant had already reconfigured its entire supply chain to focus on store fulfilment pre-pandemic, but when it hit, the same-day services that this model enabled became essential for consumers. In fact, 95% of Target's sales in November and December were fulfilled through its brick-and-mortar store network thanks to sales originated in stores, same-day order and ship-from-store options.¹⁰

The City of London is set to launch its first last-mile logistics hub.

The plan is to repurpose under-used spaces at the London Wall Car Park with Amazon Logistics as the operator. Delivering packages from the hub using pedestrian porters and bikes is projected to take 85 delivery vehicles off London's streets each day. That's 23,000 trips eliminated in central London annually.¹¹



02 Rethink asset use

Delivery companies can also enhance co-operation and move to share assets in new ways. Providing access to each other's networks can eliminate costly redundancies and reduce emissions. The United States Postal Services (USPS) is already doing this through its Parcel Select® Service. Other delivery companies—including USPS competitors—can use this ground delivery service to get sorted packages to their final stop at less cost.¹² Delivery companies and post and parcel organisations

can embrace greener practices more economically by sharing delivery infrastructure, including fulfilment and open locker and PickUp DropOff networks that support interoperability.

At the same time, cities and regulators can encourage asset sharing. One way to do this is by creating points at the outskirts of cities where deliveries are concentrated for all carriers.

03

Harness data and analytics

Act on real-time insights into consumer preferences and purchasing patterns to innovate and optimise inventory and route management for a lower last-mile carbon footprint.

03

Harness data and analytics

The more that the ecosystem knows about who will buy what, where and when, the more successful local fulfilment can be—and the more that delivery companies can plan greener routes. **While local fulfilment makes a bigger impact on the last mile than route optimisation alone, together, they can further reduce emissions between 7 and 9% in the cities we studied.**

Developing this insight goes beyond traditional customer segmentation and inventory optimisation. It is highly targeted. With contextual insights into what specific customer groups in specific geographic areas need, retailers can stock the right SKUs locally. Doing this well involves analysing a mix of internal and third-party data, social listening and monitoring local trends and events.

Getting to green

Greenplan

—a startup company funded by DHL—has developed an algorithm that supports green route planning. The algorithm accounts for inputs like carbon emissions of each vehicle type and range limits of electric vehicles. The focus is on creating efficient routes that are aligned with traffic flow so that planned tours and stop sequences make sense to drivers.¹³

Freight planners in the District of Columbia

are using data to understand what's happening at the curb and change their approach to loading zones to accommodate the rise in on-demand deliveries. They are now allocating curb usage differently depending on the time of day, and exploring the optimal location for bikeshare stations and micromobility hubs.¹⁴



03

Harness data and analytics

Such deep customer insight enables delivery companies to pursue more proactive delivery approaches that are kinder to the environment. Take anticipatory shipping, for example. Delivery companies use customer and geolocation data to ensure a package is delivered the first time. By using geolocation to see that a customer isn't home, the delivery company can automatically leave the package in an alternative location per the recipient's known preference. This eliminates exceptions that add cost—and extra trips that increase the carbon footprint. Considering that every failed delivery costs about \$5—and that 5 to 10% of all last-mile deliveries fail¹⁵—this is a much-needed improvement. One that is good for business and good for the planet.

Data insight can also help delivery companies get more value out of route optimisation on top of the 7 to 15% efficiency gains they

typically see from traditional strategies.¹⁶ **In fact, our model shows that when route optimisation is applied with local fulfilment, delivery vehicles drive 140 million kilometers less.** With more data, delivery companies can make routes more efficient, accounting for traffic and other real-time conditions. They can personalise service level commitments, using longer timelines to accommodate greener routes. They can assess local traffic and weather patterns in real time. They can integrate route planning with the availability of smart charging stations.

All of these data inputs can optimise routes with extraordinary precision, maximising drop density and reducing complexity and downtime. Cross-ecosystem data sharing via the cloud is key to making it happen.

Driving the sustainable last mile

Real change toward a more sustainable last mile takes coordination and collaboration across the ecosystem.

Every player can start to make a difference with these priority actions.

Retailers



- Entice consumers to choose in-store fulfilment.
- Transform supply chains and store networks to include dark stores, partial dark stores, and/or market fulfilment centres.
- Educate consumers on the value of consolidating deliveries.

Delivery companies



- Put data at the heart of operations to prioritise new green practices.
- Explore partnerships and ways to invest in shared assets.
- Electrify the delivery fleet with purpose-built, last-mile vehicles.

Governments



- Align sustainable last-mile strategy with economic stimulus and jobs.
- Support and promote green transport initiatives.
- Encourage the repurposing of urban spaces for local fulfilment.

Consumers



- Choose the greenest delivery option when possible.
- Take advantage of incentives to bundle deliveries.
- Consolidate trips to pick up parcels at local fulfilment centres.

The ecosystem accelerated sustainable last mile practices during the pandemic out of necessity. Now is the time to drive more meaningful and lasting change by design. There's no turning back from the changes that the pandemic made to the last mile. Consumers' shopping habits are different. Supply chains are different. Retail footprints are different. The last mile can be different too—much, much greener—if the ecosystem comes together to act on sustainable last-mile practices. Now is the time to take advantage of the momentum we're seeing today and make it more meaningful and lasting.

IN A WORLD FOREVER CHANGED BY THE PANDEMIC, THE OPPORTUNITY FOR A SUSTAINABLE LAST MILE HAS NEVER BEEN GREATER—OR MORE URGENT. EVERYONE HAS A PART TO PLAY. WHAT WILL YOURS BE?

Contact



André Pharand

Managing Director – Consulting, Post and Parcel

andre.pharand@accenture.com

André Pharand is the Managing Director for Accenture's Post and Parcel Industry. André has over 25 years of experience in the postal, express, logistics, retail, ecommerce and fulfillment industries. He has worked with over 20 postal and parcel players globally to develop new strategies, drive innovation, implement change and manage costs. André leads our thought leadership and monitors trends and disruptions impacting the industry.

With thanks to **Sarah Banks, Gemma Baker, Henry Cartwright, Pierre-Olivier Desmurs, Alexander Holst, Marius Peters, Juergen Reers, Simen Strøm Nordnes and Sean Whitehouse** for their contribution to this report.

About the research

Accenture modeled the impact of fulfilling 50% of e-commerce orders via micro-fulfilment centres, from a baseline of 0 now (based on our analysis of the market) in three cities—London, Sydney and Chicago. These micro-fulfilment centres are used to make “fast” deliveries, defined as same or next day. Model outputs included decreases in congestion (measured as kilometers travelled by motor vehicles) and decreases in emissions (CO₂, NO_x and PM₁₀). Model estimates depend on five main drivers:

- **The prevalence of micro-fulfilment currently, and the assumed increase**
- **Estimates of the number of deliveries through each delivery channel**
- **The average distance travelled for each stage of package delivery**
- **The assumed vehicles mix for each channel, and the associated emission rates**
- **The demand and substitution effects which result from free, fast delivery**

Outcomes were then calculated based on available data as well as estimated values for number of deliveries, average distance per delivery, and impacts per kilometer travelled (i.e. emissions rates for vehicle type). To estimate distance, the model assumes that central dispatch warehouses are located near airports and micro-fulfilment centres are evenly spread throughout the city. The distance from the micro-fulfilment centres to household varies by city due to population density.

**For information about
the research, contact:**

Meghan Yurchisin

meghan.yurchisin@accenture.com

Alexa Jaeger

alexa.jaeger@accenture.com

About Accenture

Accenture is a global professional services company with leading capabilities in digital, cloud and security. Combining unmatched experience and specialised skills across more than 40 industries, we offer Strategy and Consulting, Interactive, Technology and Operations services—all powered by the world’s largest network of Advanced Technology and Intelligent Operations centres. Our 514,000 people deliver on the promise of technology and human ingenuity every day, serving clients in more than 120 countries. We embrace the power of change to create value and shared success for our clients, people, shareholders, partners and communities.

Visit us at www.accenture.com.

***Disclaimer:** This document refers to marks owned by third parties. All such third-party marks are the property of their respective owners. No sponsorship, endorsement or approval of this content by the owners of such marks is intended, expressed or implied*

This content is provided for general information purposes and is not intended to be used in place of consultation with our professional advisors

Copyright © 2021 Accenture. All rights reserved. Accenture and its logo are registered trademarks

References

- ¹Accenture, “COVID-19: New Habits are Here to Stay for Retail Consumers,” at <https://www.accenture.com/us-en/insights/retail/coronavirus-consumer-habits>
- ²World Economic Forum, “The Future of the Last-Mile Ecosystem,” January 2020 at <https://www.weforum.org/reports/the-future-of-the-last-mile-ecosystem>
- ³World Economic Forum, “The Future of the Last-Mile Ecosystem,” January 2020 at <https://www.weforum.org/reports/the-future-of-the-last-mile-ecosystem>
- ⁴Amazon, “Same-Day Delivery Just Got Faster,” March 3, 2020 at <https://www.aboutamazon.com/news/operations/same-day-delivery-just-got-faster>
- ⁵Accenture analysis
- ⁶Accenture and Frontier Economics, “Last-Mile Delivery Modeling: Estimating the Impact of Micro-Fulfillment,” 2020. See Research Methodology for more information on how the analysis was done.
- ⁷Balance by Carbon Checkout at <https://apps.shopify.com/carbon-checkout-1>
- ⁸Christine Chou, “Cainiao’s Global Logistics Push Ratchets Up,” June 24, 2020 at <https://www.alizila.com/cainiaos-global-logistics-push-ratchets-up/>
- ⁹Thomas Barrett, “Consumers More Likely to Shop Somewhere with Sustainable Delivery,” April 24, 2019 at <https://airqualitynews.com/2019/04/24/consumers-more-likely-to-shop-somewhere-with-green-delivery-options/>
- ¹⁰Marian Zboraj, “Target Celebrates Strong Performance During Holiday Season,” January 13, 2021 at <https://progressivegrocer.com/target-celebrates-strong-performance-during-holiday-season>
- ¹¹Liza Helps, “Amazon Logistics Chosen to Run City of London’s First Last Mile Logistics Hub,” December 9, 2020 at <https://www.logisticsmanager.com/amazon-logistics-chosen-to-run-city-of-londons-first-last-mile-logistics-hub/>
- ¹²USPS, Parcel Select FAQ at <https://faq.usps.com/s/article/Parcel-Select>
- ¹³Helen Norman, “DHL Outlines a Plan to Shake Up the Last-Mile Space with new ‘Green’ Route Planning Algorithm,” December 2, 2020 at <https://www.parcelandpostaltechnologyinternational.com/features/dhl-outlines-plan-to-shake-up-the-last-mile-space-with-new-green-route-planning-algorithm.html>
- ¹⁴Travis Fried, Ben Welle and Sergio Avelleda, “80% of Goods Start or End in Cities. It’s Time We Started Taking Urban Freight Seriously,” September 14, 2020 at <https://thecityfix.com/blog/80-of-goods-start-or-end-in-cities-its-time-we-start-taking-urban-freight-seriously/>
- ¹⁵Industry average, Accenture research
- ¹⁶Accenture client experience