Rakuten Intelligence

Forward deployed inventory: the future of e-commerce?

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Content

Introduction

If you are over the age of 40 of so, your first online order was probably for a book and was probably placed on a PC, from an America Online account accessed through dial-up modem. Your order was likely delivered from a warehouse in Seattle and travelled thousands of miles to reach your front doorstep via third-party shipper, having taken a week or so to get there. You might have added a few other items to that order to ensure that it was big enough to avoid shipping and handling fees. This, you thought, was amazing, and undoubtedly what the future would look like.

If we fast forward to 2019, much of this has been turned on its ear. It's more likely that a first-time online buyer is doing so on a mobile device, unaware that a company called America Online ever existed. This new online buyer might be buying a book, but might just as well be buying anything else imaginable, shipped from Seattle, Shanghai, or anywhere else on the planet – including from the local retailer in your own town.

The digital shopping experience has become somewhat commoditized, with most retailers adhering to a set of commonly agreed upon design principles that make it easy for consumers to shop from new online retailers without a learning curve. But the fulfillment side of e-commerce is an entirely different story. Retailers in 2019 are faced with a fast-evolving fulfillment landscape and have an array of options available to them.

Many of us have the option of one-hour delivery for many items shipped from local stores, restaurants, or fulfillment centers. We can pick up online orders at nearby stores, without having to get out of our cars. We can pick up orders in conveniently located lockers. And we still order many items that are shipped thousands of miles to our doorsteps.

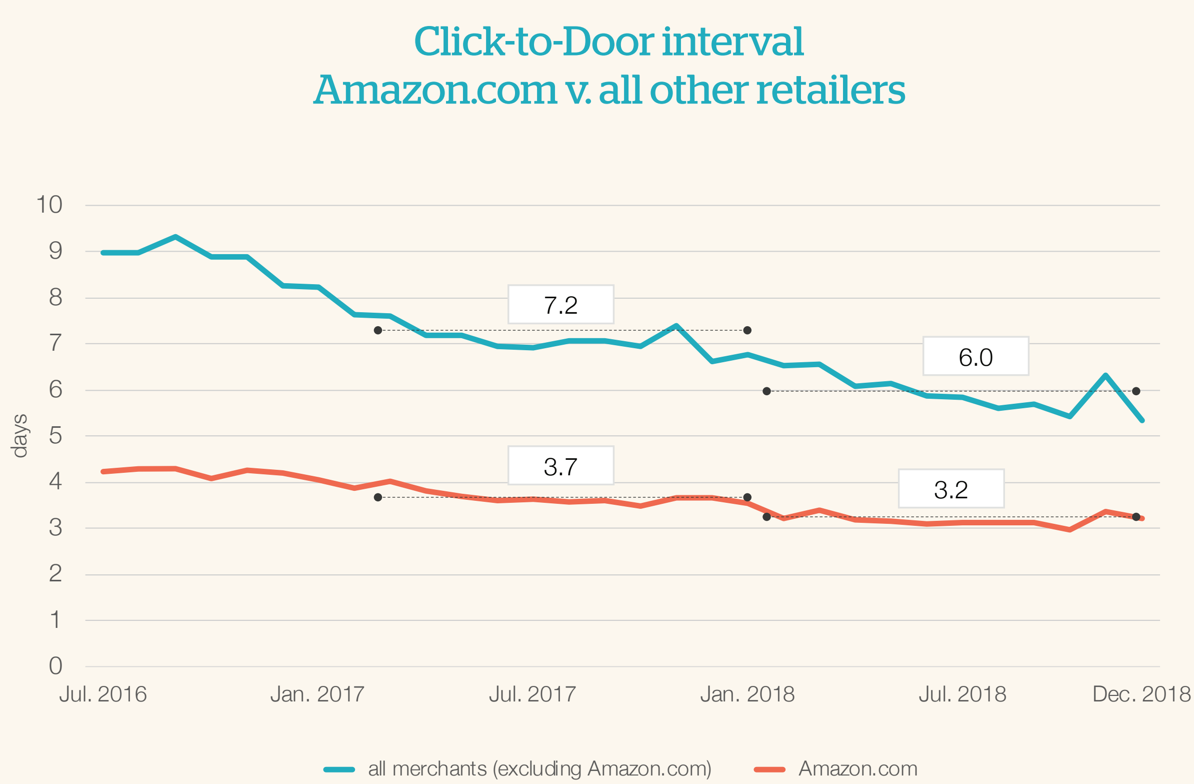
For each of these consumer options, retailers are making choices in designing, scaling, and adapting fulfillment systems toward the goal of nothing less significant than determining the line between sustainable profitability and perpetual loss.

In this whitepaper, we will look at the U.S. e-commerce fulfillment system, through the perspective of the consumer, as represented in data collected by Rakuten Intelligence, the e-commerce measurement firm that derives its data from the transactions of millions of online shoppers. We will begin by exploring the status quo for online order fulfillment—orders shipped from remote fulfillment centers, and we will then dig into the emerging alternative forms of last mile fulfillment, from Click & Carry, to ship-from-store, to same day delivery—all of which are dependent on inventory that's closer to the consumer than ever before—or 'forward deployed inventory,' in industry parlance.

The status quo

Since 2005, when Amazon launched Amazon Prime, we have seen slow, steady improvements in the interval between when a consumer places an order and when that order arrives on their doorstep, in the hands of their doorman, or in a locker [an interval that we call 'click-to-door']. Over just the past two years the average click-to-door interval dropped from 5.2 days to 4.3 days, representing improvement of 9 days, or 17 percent.

However, this click-to-door interval metric is weighted heavily by each retailer's order volume, so bigger retailers exert a significant influence on the average. And no online retailer is bigger than Amazon. Figure 1, below, shows the average monthly click-to-door interval for Amazon.com (this does not include Prime Now or Amazon Fresh) compared with all other online retailers.



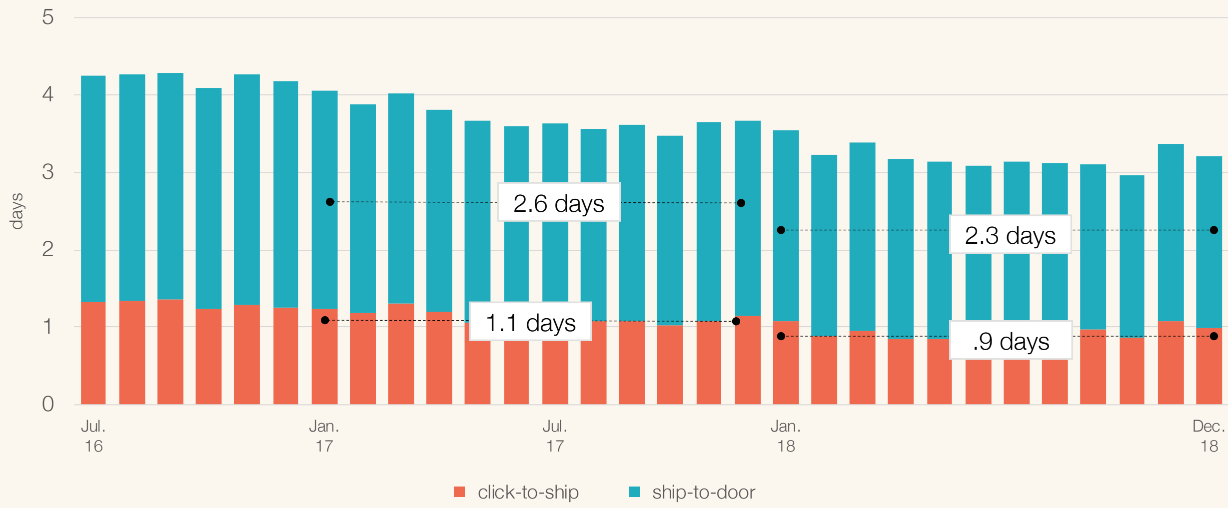
Retailers not named Amazon have dramatically improved their fulfillment center turnaround in the past two and half years. In July 2016, they collectively trailed Amazon by 4.8 days. By December 2018, Amazon's lead had dropped to just 2.1 days. More recently, though, the rate of improvement has slowed. In 2018, Amazon's click-to-door interval improved 14 percent while all other retailers' click-to-door interval increased by 17 percent. Amazon's competitors are making slow progress, but Amazon is still far ahead of the field.

Looking under the hood, we can see exactly how retailers are improving their click-to-door numbers, but we need to introduce two new metrics first. 'Click-to-ship' is the amount of time, in days, between when a retailer receives an order from a customer and when that order leaves the retailer's fulfillment center. This is generally a reflection of the efficiency of a retailers' fulfillment center, but can also be a reflection of the supply chain. Certain retailers, for example, in an effort to minimize inventory carrying costs, will only place orders with suppliers after consumers order, which can add days or weeks to the click-to-ship interval. The second bit of key vocabulary is the term 'ship-to-door' – the interval, in days, between when a retailer hands an order to a third-party shipper and when that package arrives on the customer's doorstep.

In 2018, click-to-ship speed, across all merchants, declined from 1.6 to 1.4 days, while ship-to-door declined from 3.5 to 2.9 days. Improvements in click-to-door speed were driven largely, but not exclusively, by faster deliveries.

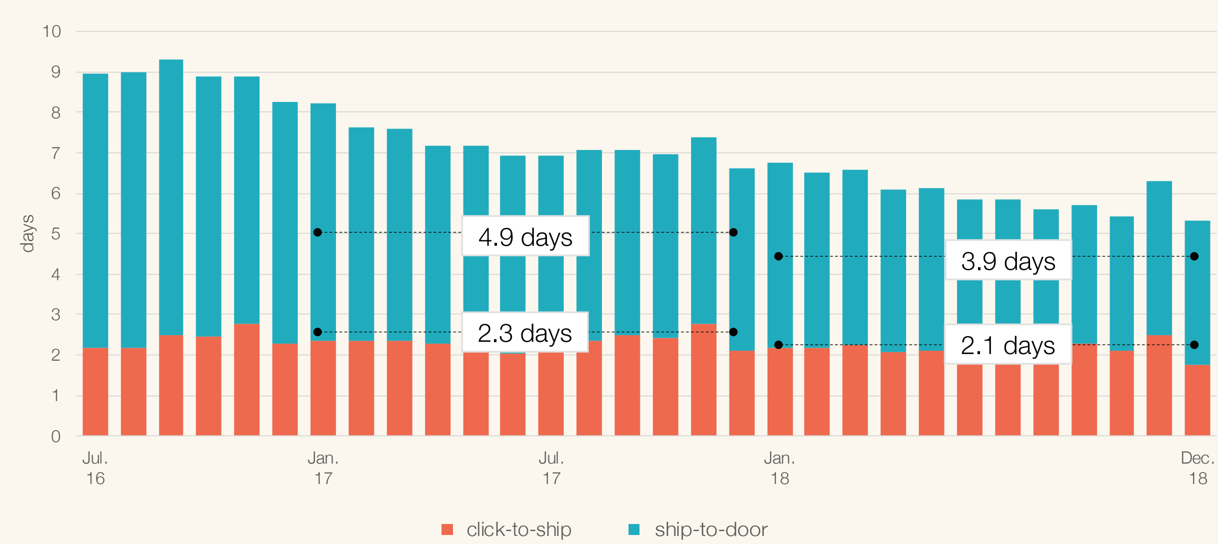
When we unpack this data, we see Amazon and the collection of all other retailers taking significantly different paths, as they all look to accelerate their click-to-door speeds (see figure 2, next page). In 2018, Amazon had an average .9 day click-to-ship interval and an average 2.3 day ship-to-door interval, compared with a 1.1 day click-to-ship and 2.6 day ship-to-door intervals in 2017. Sixty-one percent of Amazon's improvement from 2017 to 2018 came from improvements in delivery speed (measured by ship-to-door).

Click-to-Door and Ship-to-Door (days)
Amazon.com only



All other merchants, excluding Amazon, made significant headway in 2018, shaving 1.2 days off of their click-to-door interval. In contrast to Amazon, though, the rest of the field was much more reliant upon faster deliveries, with click-to-door improvements accounting for 82 percent of fulfillment speed improvements. These merchants took a full day off of their ship-to-door speeds while taking just .2 days off of their click-to-ship, or fulfillment center turnaround speeds. This strategy is costly because third-party shippers charge significantly more for expedited delivery. It costs roughly twice as much to ship the same package to the same place for two-day delivery than it would for five-day delivery.

Click-to-Door and Ship-to-Door (days)
all merchants (excluding Amazon.com)



To summarize, Amazon and all other retailers continue to drive faster click-to-door speeds, but Amazon is balancing delivery speed increases with fulfillment center turnaround, while its competitors are depending on shipping speed improvements. Amazon has accomplished this through heavy investment in fulfillment centers, investing in automation as well as more square footage deployed closer to the consumer. According to MWPVL International, Amazon had 138 active fulfillment centers in the U.S. as of March 2019, occupying 107 million square feet, with another 38 facilities and 29 million square feet planned.

Increasing automation and tighter operations benefit Amazon's click-to-ship interval. The addition of facilities, presumably putting Amazon closer to more consumers, means that packages don't have to travel as far, which reduces the cost of fulfillment while increasing ship-to-door speed. Amazon uniquely has the scale to do this, with roughly 10 times the market share of its next nearest competitor, when we include first and third-party sales. In fiscal 2018, Amazon spent $34 billion on fulfillment expense, its biggest cost after cost of goods sold. Fulfillment expense grew by 35 percent in 2018 while overall operating expenses increased by only 27 percent. Amazon's edge is not coming cheaply.

Forward deployed inventory gains traction

Brick and mortar retailers, recognizing that they cannot compete with the scale of Amazon's direct-to-consumer focused fulfillment system, have not given up. Instead, they are seeking to leverage their biggest established advantage; their stores and the inventory carried in those stores that is deployed near consumers. This is currently most clearly manifested in Click & Carry (or buy online, pickup in store), but ultimately, it may be ship-from-store that allows brick and mortar retailers to collectively catch up with Amazon.

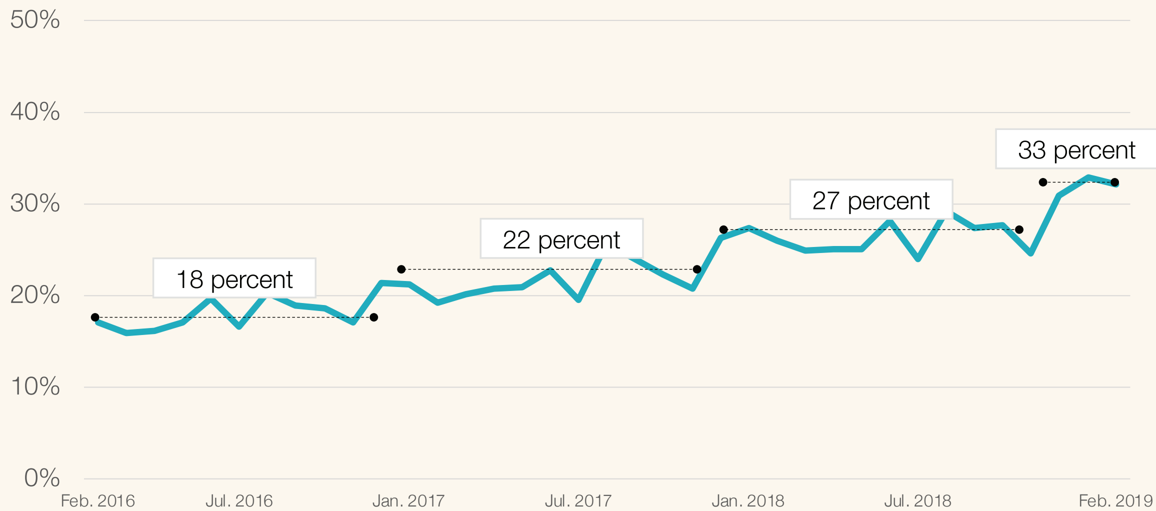
Click & Carry hits its stride

Click & Carry has long promised to be a salvation for brick and mortar retailers. Rather than having to drive to the customer's front door, the customer comes to you! The reality, though, has been messy. Retailers have far less visibility into what is in stock in their stores at any given point in time, causing consumers to find that their item wasn't actually in stock only when they came to pick up their order. Retail employees (Apple Store and Best Buy associates notwithstanding) aren't known to be technology savvy, and early versions of Click & Carry created myriad technology troubleshooting issues. Finally, in the early days of Click & Carry, retailers were still holding out hope that if they compelled the customer to wind her way to the Click & Carry pickup desk at the back of the store, she might make incremental purchases, resulting in an arduous, often fruitless, experience.

However, it has been nearly 20 years since brick and mortar retailers began offering Click & Carry and they have been able to work many of the kinks out of their operations, which has increased consumer confidence and led to an increasing share of online sales from brick and mortar retailer through Click & Carry.

In figure 4, next page, we track Click & Carry as a percent of online sales across the biggest 10 brick and mortar retailers (based on online sales). In 2017, 22 percent of online sales for this group were through Click & Carry. In 2018 that had climbed to 27 percent.

Click & Carry as a percent of online sales
Top 10 online brick and mortar retailers



* Includes Walmart, Target, Best Buy, Kohl's, Nordstrom, Home Depot, Costco, Old Navy, Apple, Macy's

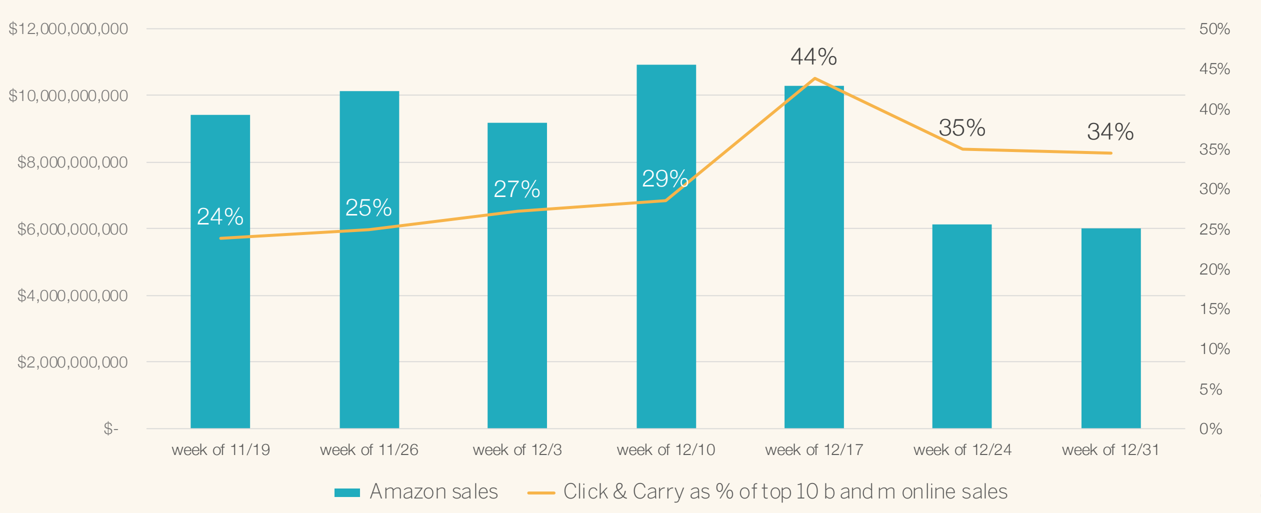
What has changed? Part of the answer lies in retailer experience. With 20 years of practice, retailers have a better understanding of what is in stock, have gotten better at establishing safety stock levels, and have developed better technologies and systems for employees to fulfill Click & Carry orders from in-stock inventory. At the extreme, we are seeing retailers employ a strategy of deploying 'micro fulfillment centers' within existing stores. Ahold's Stop and Shop, for example, has partnered with Takeoff Technologies to build small, automated, fulfillment centers in stores with the intent of fulfilling online orders, for either delivery or Click & Carry. The core idea of the micro fulfillment center is that picking orders from the same store shelves from which store shoppers pick will inevitably fail. Stores are well laid out for shopping, but there is a big difference between shopping and picking efficiently.

And there is the problem of scale: If Click & Carry became a significant contributor to store sales, it is easy to envision store pickers fighting with shoppers for the last gallon of milk.

Most importantly, though, retailers have invested to make it easy for consumers to pick up their online orders. Walmart is at the forefront here, with its Walmart Grocery Click & Carry offering in 2,200 stores at the end of 2018. Rather than forcing consumers to get out of their cars to pick up their orders, they just drive up to a spot, or into a bay and a Walmart employee loads their order. This took an important leap of faith from Walmart; that there was more to be gained by making store pick-up easy than by forcing customers to slog to the back of the store and hopefully pick up toilet paper and a TV while they're at it.

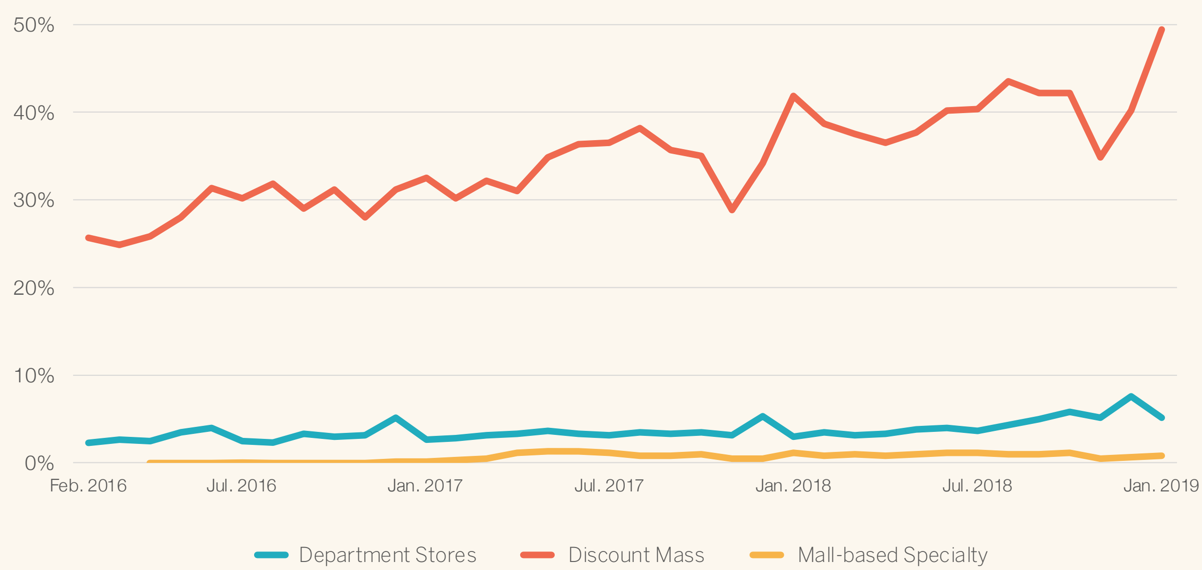
The consumer proposition for Click & Carry is compelling as well. Generally, consumers don't pay fees for Click & Carry orders, although this is not universal. Immediacy may well be as important as cost for consumers. In figure 5 below, we look at Amazon.com sales by week during holiday 2018 (blue bars) against Click & Carry as a percent of online sales (yellow line) for the top 10 brick and mortar retailers. During the week of December 17th, as consumers start to shift away from Amazon—presumably due to worries about getting their packages in time for Christmas—we see Click & Carry grow from 29 percent to 44 percent of online sales volume for big brick and mortar retailers.

Amazon.com weekly sales compared with Click & Carry penetration of sales amongst top 10 brick and mortar retailers—holiday 2018



Click & Carry, though, is unevenly applied throughout the brick and mortar universe. We see significantly different Click & Carry penetration rates in different retail sectors. Discount mass retailers (Target and Walmart) have reached a point where 50 percent of online sales are Click & Carry, while department stores (think Nordstrom and Macy's) and mall-based specialty retailers (like Victoria's Secret and Gap) both fall below 10 percent. This is likely driven by the physical accessibility of mass discount merchants, which tend to have their own parking lots and more control over how they use their space. As destinations, malls tend to be less conveniently located for our day-to-day commutes. And retailers that don't have their own entrances (the vast majority of mall-based retailers) cannot refit their stores to make Click & Carry easy.

Percent of online sales through Click & Carry by retailer segment



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Department Stores include: Nordstrom, Macy's, Bloomingdale's, Sak's, Neiman Marcus, Dillards, Belk

Mass Discount includes: Target, Walmart

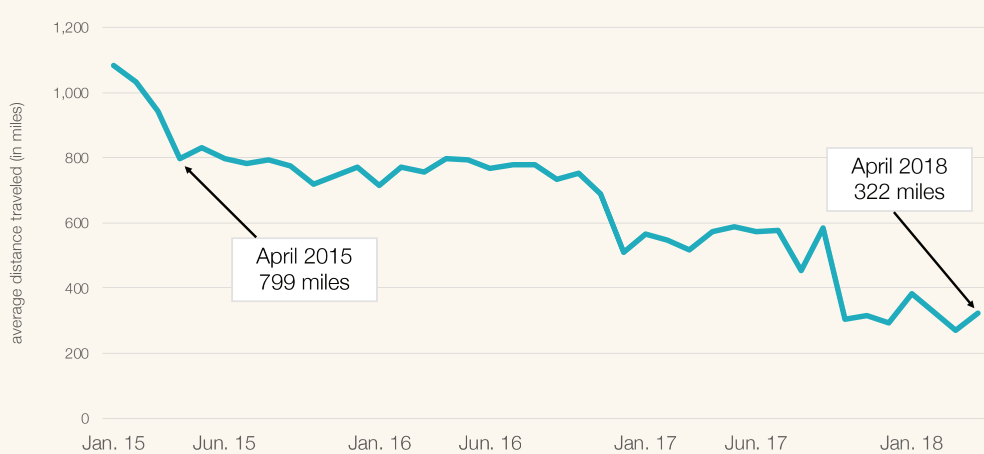
Mall Specialty includes: J. Crew, Foot Locker, Gap, Banana Republic, Williams Sonoma, Victoria's Secret, Forever 21, Aldo, Aeropostale, American Eagle, Chico's, Justice, Lids, Sephora

Smarter ship-from-store delivers advantages to brick and mortar retailers .

Because it alleviates the burden of delivery on the retailer and drives such appealing economics, Click & Carry is far more mature than its cousin, ship-from-store. Ship-from-store takes two forms today. Most prominent is delivery from grocery stores and restaurants, often powered by third-party service providers such as Instacart, Shipt, Grubhub, and Uber Eats. In 2018, sales volume from Instacart, Shipt, Amazon Prime Now, Doordash, and Postmates alone exceeded $10 billion.

The second form of ship-from-store that is now gaining prominence is a model where retailers are pulling items from the inventory of stores and delivering using traditional third-party shippers, such as FedEx, UPS, and the U.S. Postal Service to deliver to consumers. This allows retailers to leverage inventory that sits closer to consumers and avoid those thousand plus mile deliveries. Amongst large retailers, Target has been most visible here, saying that 75 percent of online orders were fulfilled from stores in Q4 2018, with store-based delivery accounting for a significant portion. Figure 7 below tracks the distance that the average Target.com order travelled to its end recipient. We can see that in April 2015, packages travelled an average of 799 miles, compared with only 322 miles by April 2018. Target says that shipping from nearby stores is 40 percent less expensive than shipping from remote distribution centers.

Average distance that Target.com packages travel



An even more aggressive ship-from-store effort is underway at Aldo, the shoe brand and retailer. Aldo, working with its fulfillment technology vendor, Celect, is moving toward a model where it ships all orders from stores, turning its stores, collectively, into a distributed virtual warehouse. Aldo uses artificial intelligence to determine the best store to ship from, based upon a variety of factors, including: inventory levels, inventory turnover, and proximity to the customer.

The future of shipping is closer than you think

It is clear that we are in the early stages of a seismic shift in e-commerce fulfillment which will change the nature of retail itself. Innovations in how orders are fulfilled and which inventory pools they are pulled from are allowing retailers to rethink their e-commerce strategies in ways that will change not just their e-commerce businesses, but their long-term corporate strategies.

The first stage of e-commerce fulfillment was modeled after the catalog fulfillment model that had been around for decades. Goods were shipped to consumers from remote fulfillment centers via third-party shippers. Because there weren't many of these warehouses, it made economic sense to carry a wide array of items. Thus, breadth of selection became one of the core tenets of the burgeoning e-commerce sector.

In this next phase of e-commerce fulfillment, we will see brick and mortar retailers—particularly those with many stores not trapped inside malls—move toward models that are principally based upon the idea of distributed inventory that is close to the consumer, powered by artificial intelligence technologies that dictate the most effective inventory source to tap into for each purchase.

Inventory in the fat part of the product curve—the fast turning items that account for the vast majority of sales—will sit in stores near us, fulfilled by short range deliveries and Click & Carry. Many retailers will decide that the costs associated with carrying every item known to man isn't worth the effort and will happily cede that opportunity/albatross, focusing instead on profitably providing their customers with access to most, but not all, of what they need quickly and cheaply. Long tail items bought online will be more expensive than they are today as competition for the long tail wanes. This is foreshadowed by Target's recent decision to launch a marketplace focused on carefully curated brands, rather than an Amazon-like marketplace to aspires to offer everything.

We will go to a retailer like Amazon when we need a highly specialized motor oil for our classic car, but will find that it is cheaper and easier to procure run-of-the-mill WD-40 from the store within a 10 minute drive of our homes.

The next generation of stores will operate with micro fulfillment centers, or some less automated online order picking space in the back to efficiently process a growing volume of online orders while retailer selling floors will specialize in showcasing the products that we enjoy shopping for or that we want to scrutinize closely. Stores will be designed with the idea that the majority of store sales volume will be picked up from a drive-through bay, just as fast food restaurants today see the majority of sales through drive-through windows.

With increasing volume moving toward online ordering, shippers such as UPS and FedEx will benefit from a growing e-commerce pie, but will find that Click & Carry takes increasing share. They will also, in a nod to Clayton Christenson, feel compelled to set up divisions within their companies that will compete with their mainline operations, engineered to manage fulfillment at lost cost over short distances. Shorter range deliveries will speed the move to electric fleets of smaller, likely autonomous vehicles. Whether UPS or Uber wins this war is not obvious.

Believe it or not, we are poised to break out of a relatively dull phase in the life cycle of e-commerce. Enjoy a relaxing vacation, recharge your batteries, and get ready to tackle the next opportunities in e-commerce fulfillment, because the really interesting part is just around the corner.

About Rakuten Intelligence Data

Rakuten Intelligence (formerly known as Slice Intelligence) is a market research company which derives online purchase data and insights from a panel of millions of U.S. panelists. We utilize proprietary machine learning techniques originally developed at Stanford University to extract e-commerce purchase data from electronic receipts married to other complementary sources of data, projected to the U.S. population.

In addition to tracking what our panelists buy online, we are able to see a wide variety of key logistics data points that are extracted from electronic receipts and from tracking information provided to our panelists by third-party shippers.

Ken Cassar is the VP, Strategy & Insights at Rakuten Intelligence, where he oversees the research agenda; identifying and contextualizing e-commerce industry trends from Slice's panel of millions of U.S. online consumers.

Ken brings a rich online retail background to Rakuten Intelligence. Most recently, Ken was the senior Vice President, Analytic Solutions at Nielsen, where he collaborated with clients to help them understand and adapt to the impact of e-commerce and digital advertising on their businesses. Prior to Nielsen, Ken was an analyst at Jupiter Research, where he was an early thought leader, trusted adviser and media source on e-commerce.

Ken is a regular contributor to RetailWire's Braintrust, a member of the Path to Purchase Institute's faculty, and often presents at industry conferences, including Shoptalk, Shop.org, Internet Retailer Conference and Expo, Path to Purchase Institute Expo and the Category Management and Shopper Insights Conference. Ken is also frequently quoted as an e-commerce industry expert in publications such as The New York Times and The Wall Street Journal. He has an MBA and Bachelor's Degree in Political Science from the University of Connecticut.