

US E-Commerce Trends and the Impact on Logistics

The growth of last-mile delivery and demand for next- and same-day service is pushing logistics beyond traditional hub and spoke models to regional options, crowdsourcing, digital, and smart automation.

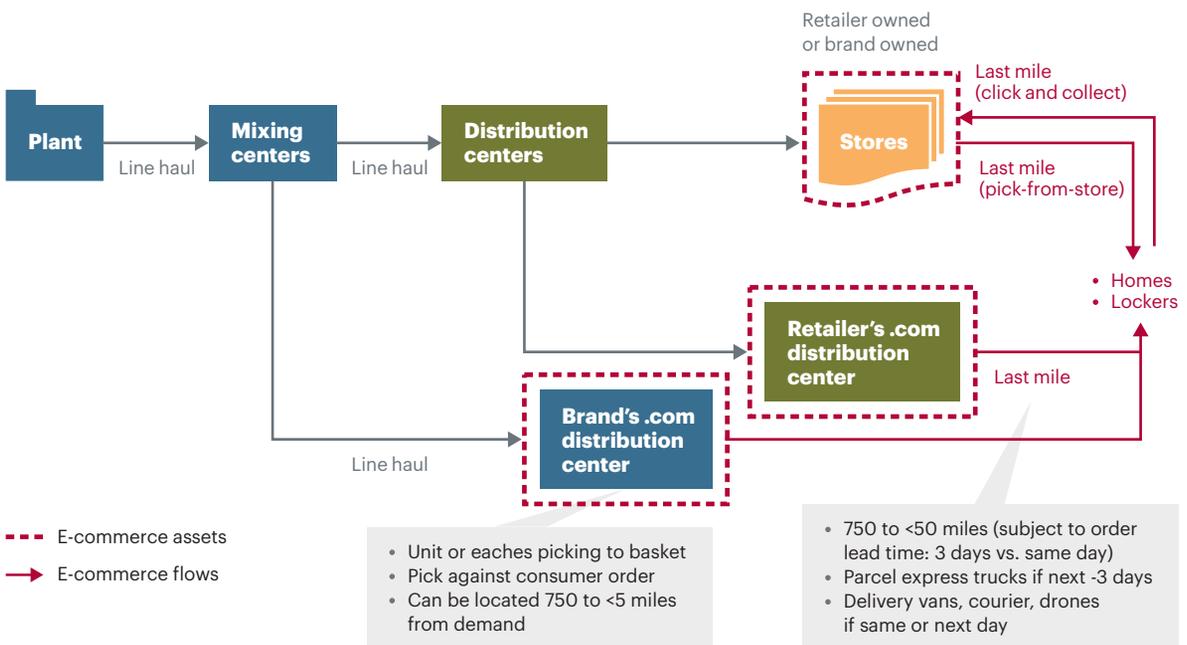


How E-Consumers Shop

Compared to low overall retail growth of just 1 to 2 percent, e-commerce is on fire. This retail channel is a \$370 billion market expanding at a 15 percent compound annual growth rate (CAGR) according to Forrester. Also referred to as B2C or direct-to-consumer commerce, e-commerce accounts for 8 percent of overall retail sales today and is expected to make up 14 to 16 percent (\$1 trillion) of the US retail landscape by 2022.

E-commerce presents a fundamental shift in how consumers shop. Instead of firms pushing cases and pallets to physical stores, e-commerce has consumers pulling customized baskets to their desired location, whether home, a nearby store, or other convenient location such as lockers. This push-to-pull model has created a structural change in underlying supply chains and the movement of goods in terms of product flow, location of assets, delivery mode, and enabling technologies and analytics. Figure 1 illustrates a typical e-commerce pull supply chain.

Figure 1
The e-commerce “pull” supply chain



Source: A.T. Kearney analysis

About the Report

As part of the ongoing collaboration between The Council of Supply Chain Management Professionals (CSCMP) and A.T. Kearney, we are pleased to bring you the report *US E-Commerce Trends and the Impact on Logistics*. Consistent with the new

emphasis in the 2016 CSCMP *State of Logistics Report* on relevant trends and expected changes in logistics, this report discusses the current state and future direction of the US e-commerce logistics market. The report draws on the experience of CSCMP leadership

and membership, other logistics practitioners, A.T. Kearney experts, and interviews with shippers, carriers, and customers, to bring the reader unique insights on cutting-edge trends.

Rapid Changes to the Landscape

Two phenomena characterize emerging e-commerce logistics.

Placing assortment close to demand

As retailers and brands seek to enhance the direct-to-consumer value proposition and compete for e-commerce share, they are constantly working to offer a larger assortment and reduce delivery lead time. Consequently, retailers and brands are forward-deploying a wider mix of stock-keeping units (SKUs) to fulfillment centers, where piece-picking of individual SKUs for orders (eaches picking) takes place. The most aggressive example of this trend is Amazon, which invested more than \$13 billion to activate 50 eaches picking warehouses across the United States from 2010 to 2016. This massive investment has allowed Amazon to offer hundreds of thousands of SKUs and promise customers next-day delivery of them all.

UPS generated \$17 billion in e-commerce deliveries... estimating that DTC sales will account for half of its \$35 billion in US domestic parcel revenue in 2016.

Walmart has also made significant investments in this area, building six eaches picking fulfillment centers in major demand areas to enable two-day delivery. Other retailers and brands across categories have followed suit and are deploying inventory closer to demand, with either dedicated internal operations or across shared facilities managed by third-party logistics (3PL) partners. What's more, firms with existing store assets are aggressively piloting order fulfillment from these outlets as a way to leverage current inventory that is close to demand. Overall, forward deployment is creating rapid growth in delivery volume in the last mile, which leads to the second phenomenon shaping e-commerce logistics.

The growing need for last-mile delivery

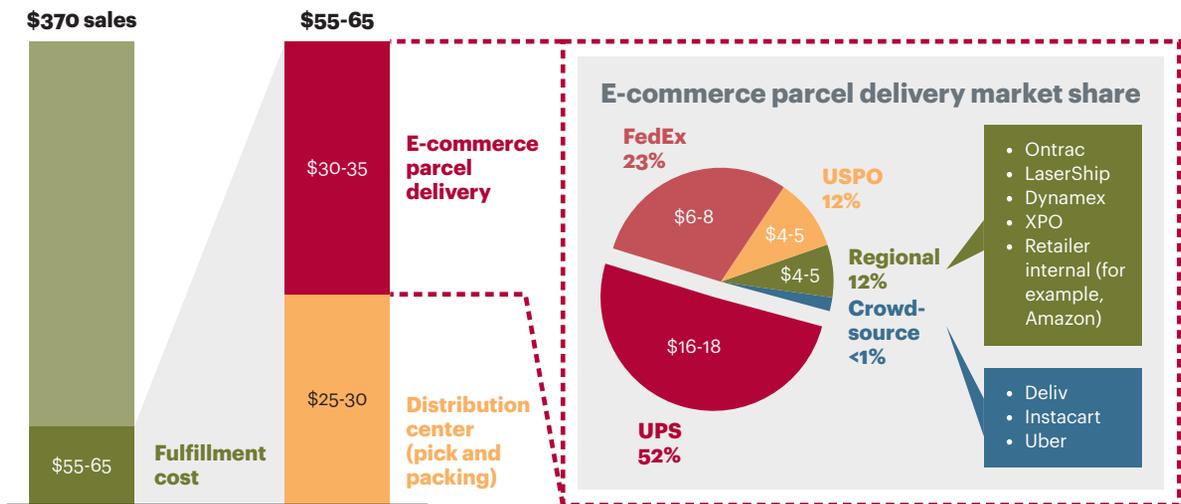
According to United Parcel Service (UPS), 50 percent of its domestic parcel deliveries are the last-mile portion for e-commerce orders. They travel from an eaches picking fulfillment center or a local store to the end consumer demand point. E-commerce orders took eight days from order placement to delivery in 2014; today, the click-to-door lead time is five days.¹ As consumer demand for faster lead time drives companies to forward-deploy more inventory, we expect the average last-mile distance to continue to shrink. In addition, more retailers and brands offering free returns as a table-stake value proposition is driving last-mile volume growth in reverse logistics.

Last-mile delivery is big business. Retailers and brands will spend as much as \$55 to \$65 billion in picking, packing, and last-mile transportation to get \$370 billion in online sales to consumers in 2016. This expenditure accounts for 15 to 18 percent of sales (see figure 2 on page 3). These

¹ Excludes Amazon; average timespan from Q1 2014 to Q1 2016, includes order processing at the fulfillment location (warehouse or store) and last-mile delivery transit time; Slice Intelligence 2016

Figure 2
E-commerce sales and fulfillment costs

US\$ billion, 2015



Sources: eMarketer; Forrester; UPS; FedEx; Stifel Last Mile report; A.T. Kearney analysis

supply-chain costs are significantly higher than those seen by traditional retail-store channels, where such costs account for 4 to 9 percent of sales.

E-commerce businesses will spend up to \$25 to \$30 billion on distribution-center picking and packing activities alone in 2016. The balance (\$30 to \$35 billion) will be spent on last-mile transportation and delivery across three carrier segments: national parcel carriers (including UPS, FedEx, and the US Post Office), regional short-haul shippers (such as Ontrac, LaserShip, and XPO Logistics), and crowdsourced platforms (including Deliv and Uber).

As we mentioned above, national carriers have an expensive, well-developed hub-and-spoke delivery network that optimizes economies of scale. They pool e-commerce volume with other non-direct-to-customer (DTC) parcel-line haul volume and delivery speed through their extensive fleets of last-mile trucks and zone-skip programs. Regional carriers such as Ontrac, LaserShip, and XPO are much smaller in scale but seek to unlock local, and often lane-specific, efficiency—for example, a route from eastern Pennsylvania to Boston and New York. LaserShip focuses on last-mile deliveries along the East Coast through its network of delivery hubs that are strategically located close to both customer fulfillment centers and major demand areas. This allows LaserShip to pick up and deliver orders in a next-day to three-day delivery window without the need for expensive hub-and-spoke infrastructure. Ontrac and others operate on similar principles on the West Coast and central region respectively.

The big three national carriers account for 85 percent of the last-mile market today, about \$30 billion of spend. UPS has the largest share and generated about \$17 billion in e-commerce deliveries. It is estimated that DTC sales will account for nearly half of UPS's \$35 billion in US domestic parcel revenue in 2016. FedEx drove an estimated \$7 to \$9 billion in e-commerce deliveries, accounting for approximately 35 to 40 percent of its total ground business.

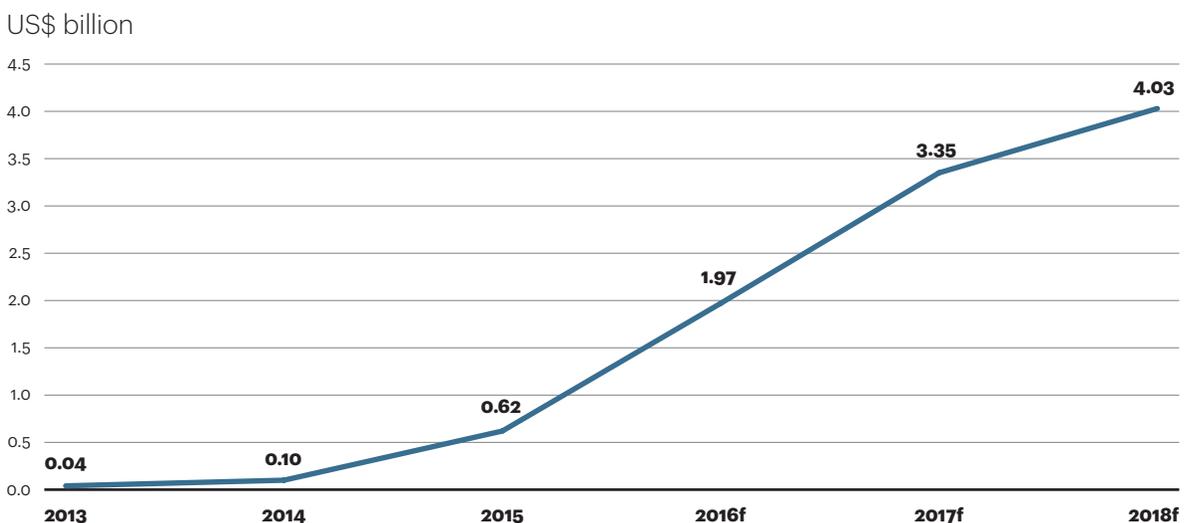
Regional or local shippers account for a modest \$4 to \$5 billion (about 12 percent), and crowd-sourced models currently account for less than 1 percent of last-mile deliveries, limited primarily to the approximate \$0.6 to \$1 billion in same-day deliveries. However, as consumer expectations for faster lead times increase, along with advances in disruptive technologies, the distance profile and supply market configuration of last-mile deliveries will continue to evolve.

Emerging Trends and Implications

Rise of same-day delivery

Retailers are trying to further reduce lead time. In fact, same-day delivery has grown rapidly in recent years, spearheaded by demand- and supply-side drivers. According to B.I. Intelligence, same-day volumes could reach \$3 to \$4 billion by 2018 (see figure 3).

Figure 3
Same-day delivery market



Sources: B.I. Intelligence; A.T. Kearney analysis

On the demand side, consumers, especially urban millennials, expect faster delivery of their online orders. Product categories for instant gratification or immediate consumption such as food, consumables, and luxury items are well-suited for same-day service. In a recent survey by Stifel Financial Corp., about 60 percent of millennials expect same-day delivery as an option with their online purchases and more than 60 percent of consumers are willing to pay more for same-day convenience.²

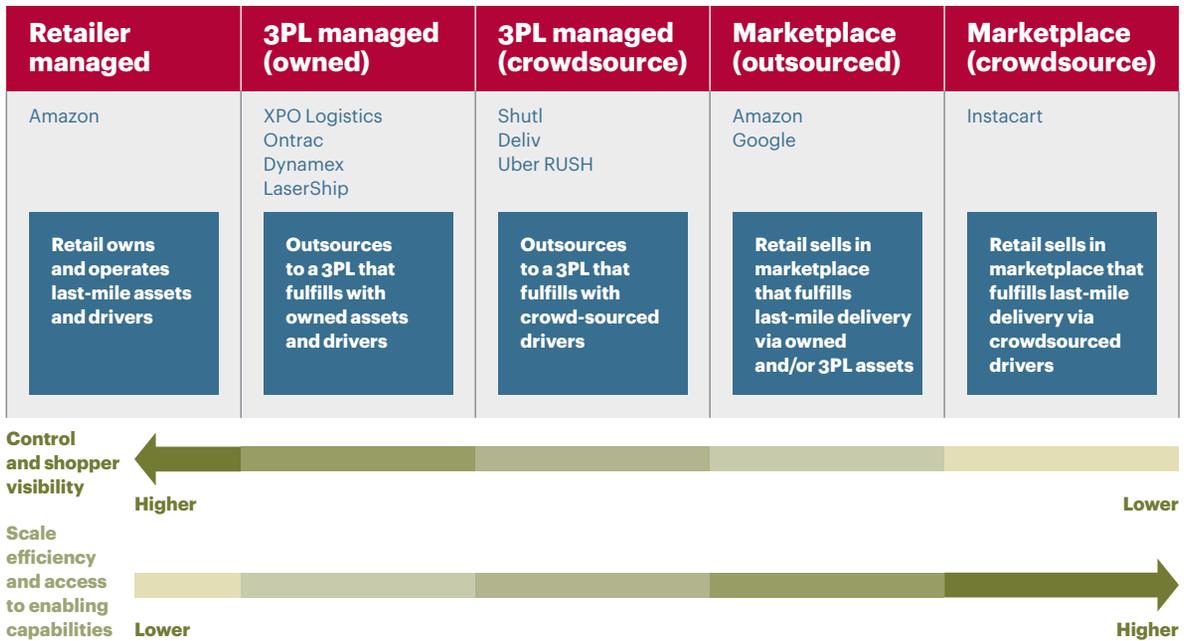
On the supply side, companies such as Amazon and Google and crowdsourcing platform start-ups such as Uber and Deliv are aggressively trying to establish marketplace-based models to reduce the cost of same-day delivery (see figure 4 on page 5).

² See "Home Delivery and Final Mile Services," July 2016

Figure 4

Companies are working to reduce same-day delivery costs

Non-exhaustive



Source: A.T. Kearney analysis

Same-day economics is a direct function of demand density. A last-mile delivery run in a dense urban center with an average 0.2 to two miles between stops can cost \$5 per stop, whereas a similar run in a low-density area with five to 20 miles between stops can cost \$20 to \$30 per stop. Crowdsourcing platforms can match supply (available couriers) with demand (orders dropped at a nearby store or distribution center for pickup) in real time to minimize the average drive-time distance between stops.

The increase in same-day delivery will directly shift last-mile delivery volume away from a national hub-and-spoke parcel carrier network to local couriers, whether they are crowdsourced or managed by 3PLs. UPS recently hedged against this shift by investing \$28 million in Deliv, a 3PL same-day crowdsourcing platform. We expect to see UPS, FedEx, and Amazon continue to invest in same-day start-ups and technologies. Retailers and brands are expected to continue to pilot and experiment with same-day options as they pursue their e-commerce and omnichannel fulfillment strategies.

Digital technologies and automation accelerate

Rapid advances in digital technologies and automation will continue to influence e-commerce logistics. The 2016 Stanford University One Hundred Year Study on Artificial Intelligence concludes that artificial intelligence will disrupt logistics and transportation as we know them.

Statistical machine-learning algorithms are now being used, for example, to improve long-tail SKU forecasting. The algorithms integrate disparate demand signals to forecast SKU levels, and the engine is refined and updated through a post-sales feedback loop. Improving long-tail SKU forecasting is critical as retailers seek to forward-deploy a broad assortment to online shoppers.

Digital to Make It All Work

For all the headaches in providing shoppers with next-day or same-day delivery, there are digital enablers and capabilities on the horizon to make it all work.

Replenish inventory at the right last-mile location. Predictive analytics for long-tail online SKU forecasting will improve inventory replenishment. The analytics relies on deep learning for refining prediction at the granular level, markets, outlets, and SKUs, and on IoT sensors on shelves

and in picking locations to send real-time replenishment signals.

Sub-scale last-mile delivery for low-density markets. The objective is to create an Uber-like marketplace to match trucks with routes, using analytics for route matching and to create two-sided market platforms, and connectivity via geosensing apps. For last mile and rural last mile, drones combined with semi-autonomous trucks (mini-warehouse) will handle rural last mile, while delivery

robots will handle last mile. This will require real-time coordination with consumer apps—enabled by radar, LIDAR, and camera sensors—drone technologies, and HMI (ADAS pilot assistance).

Close-to-demand fulfillment centers. Watch for shared urban fulfillment centers with integrated OMS and WMS that are supported by cloud-based order management systems and WMS integration.

Robot deliveries are coming, too. The start-up Starship Technologies is piloting robot delivery vehicles in European cities and will soon begin tests in Washington, D.C. The self-driving bots can carry orders as heavy as 40 pounds up to three miles. A global positioning system and 360-degree camera sensors allow autonomous navigation, cutting the labor cost for delivery by 75 percent. Delivery bots work well in urban centers and could face fewer regulatory hurdles than drones.

A Sign of Things to Come

While it is difficult to predict the large-scale viability of the technologies mentioned in this article, there is more certainty around the underlying digital enablers and capabilities. Cloud-based analytics, real-time connectivity, and image-recognition sensors are advancing at an exponential pace. We will see more tests and pilots of new solutions to address the constraints and challenges of e-commerce logistics (see sidebar: Digital to Make It All Work). To keep pace with or outpace competitors' adoption of e-commerce logistics, retailers and carriers will need to continually scan the technology market and embed rapid experimentation and scenario planning into their e-commerce strategies.

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About A.T. Kearney

A.T. Kearney is a leading global management consulting firm with offices in more than 40 countries. Since 1926, we have been trusted advisors to the world's foremost organizations. A.T. Kearney is a partner-owned firm, committed to helping clients achieve immediate impact and growing advantage on their most mission-critical issues. For more information, visit www.atkearney.com.

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