McCormick

Northwestern Engineering

Northwestern University Transportation Center

Freight Transportation & Logistics

eCommerce Trends

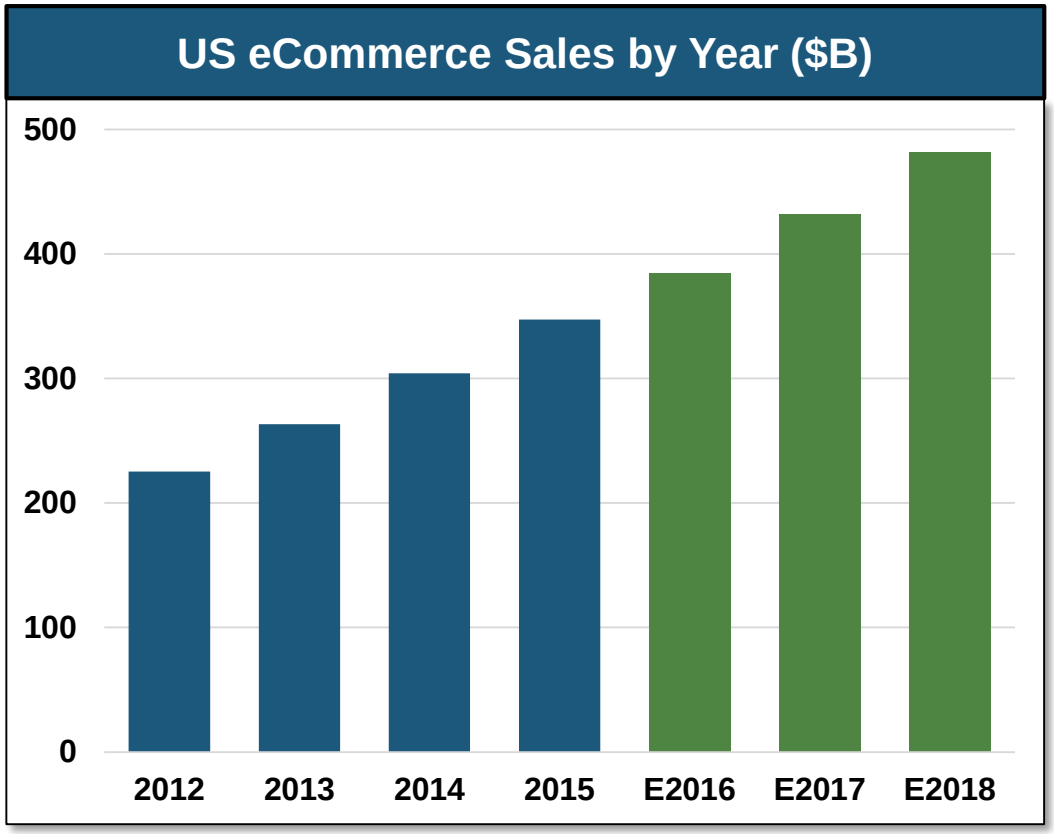
May 11, 2016

Transportation and Logistics Advisors, LLC

Agenda

- **Market Size and Characteristics**
- Key eCommerce Trends
  - Companies Building Capabilities
  - Transportation Models
  - Fulfillment Models
  - Relative Economics

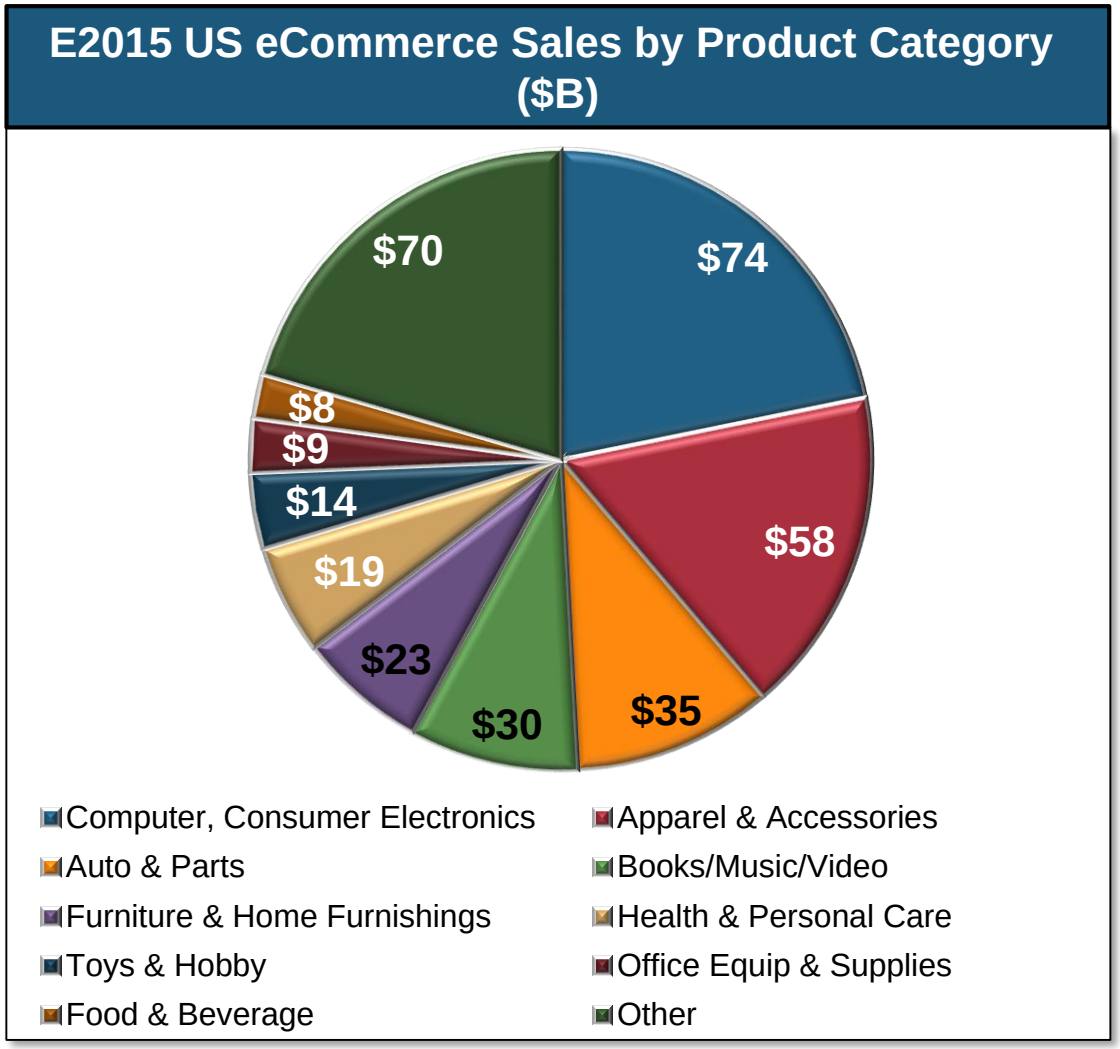
eCommerce is an estimated $340 B market, forecasted to grow 12% per year over the next three years



- Estimated 2015 eCommerce sales of $340 B
- 2012 to 2015 eCommerce sales CAGR of 15%
- eCommerce sales forecasted to grow by 12% per year 2015 to 2018
- eCommerce sales accounted for about 7.3% of total 2015 retail sales
  - 9.4% of retail sales excluding autos, fuel
- Traditional retailing is still vast majority of market

Source: Internet Retailer; US Census Bureau; Statista

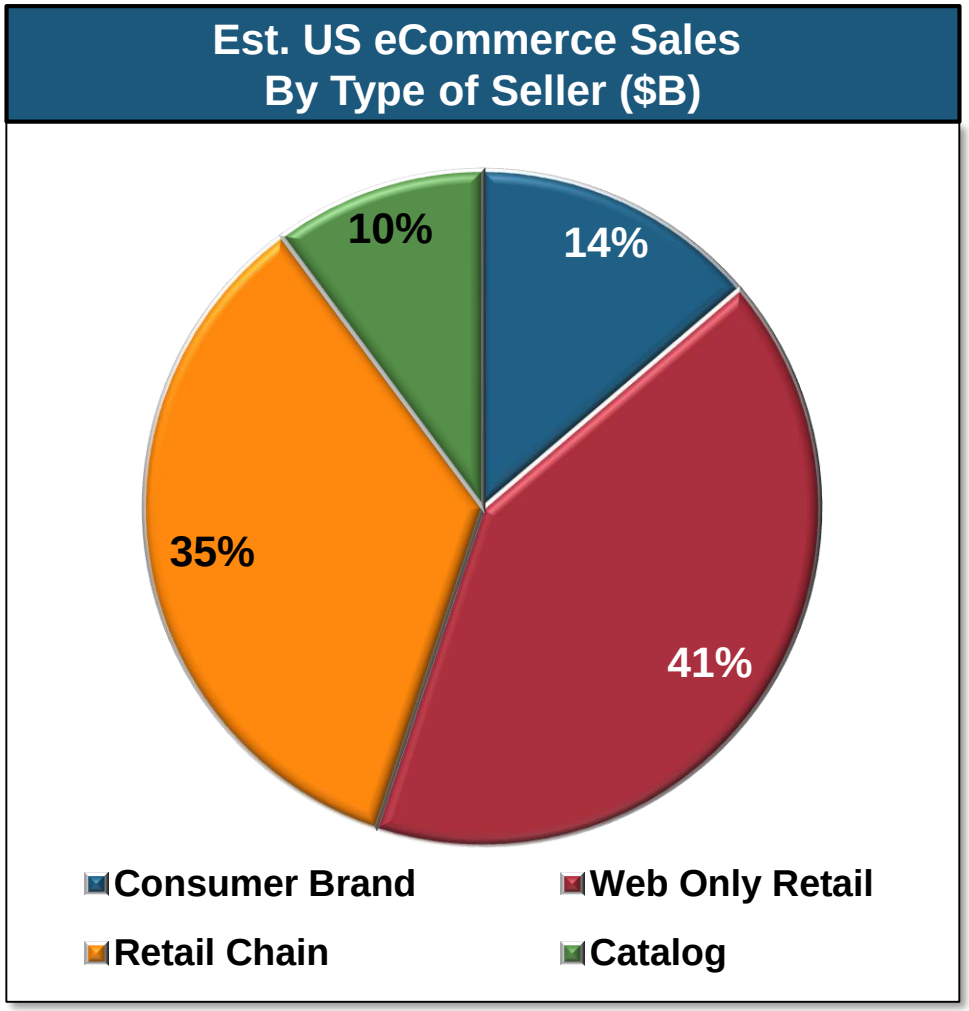
Consumer electronics and apparel account for nearly 40% of eCommerce sales



- eCommerce sales are along a wide range of product categories
- Consumer electronics is the largest category at an estimated $75 B, followed by apparel at an estimated $58 B

Source: eMarketer, April 2014, Factiva, our estimates

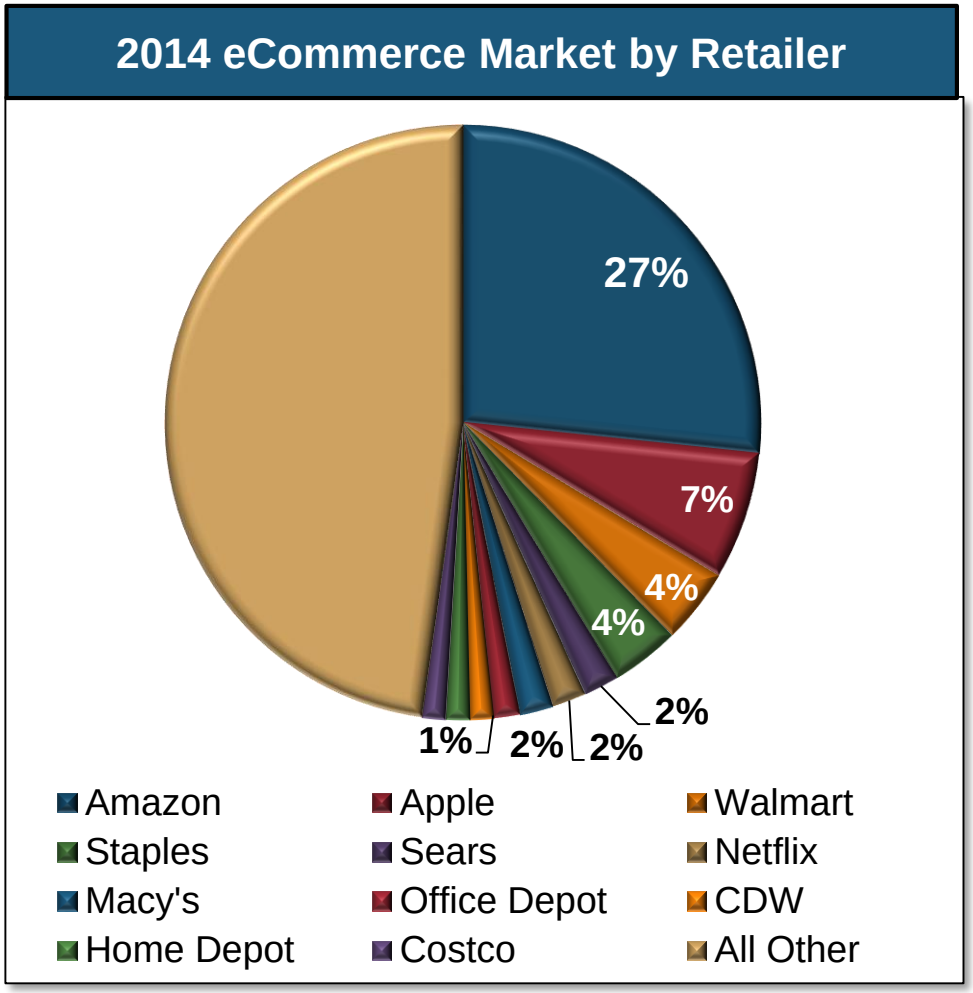
Web only retailers and traditional retail chains account for 75% of eCommerce sales



- Estimated companies in Top 500 eCommerce retailers by segment
  - Web only: 200
  - Retail Chain: 160
  - Catalog: 70
  - Consumer Brand/ Manufacturer: 70

**Based on Consumer Brand share of Top 500 and total estimated 2014 eCommerce sales*
Source: 2013 Internet Retailer Top 500

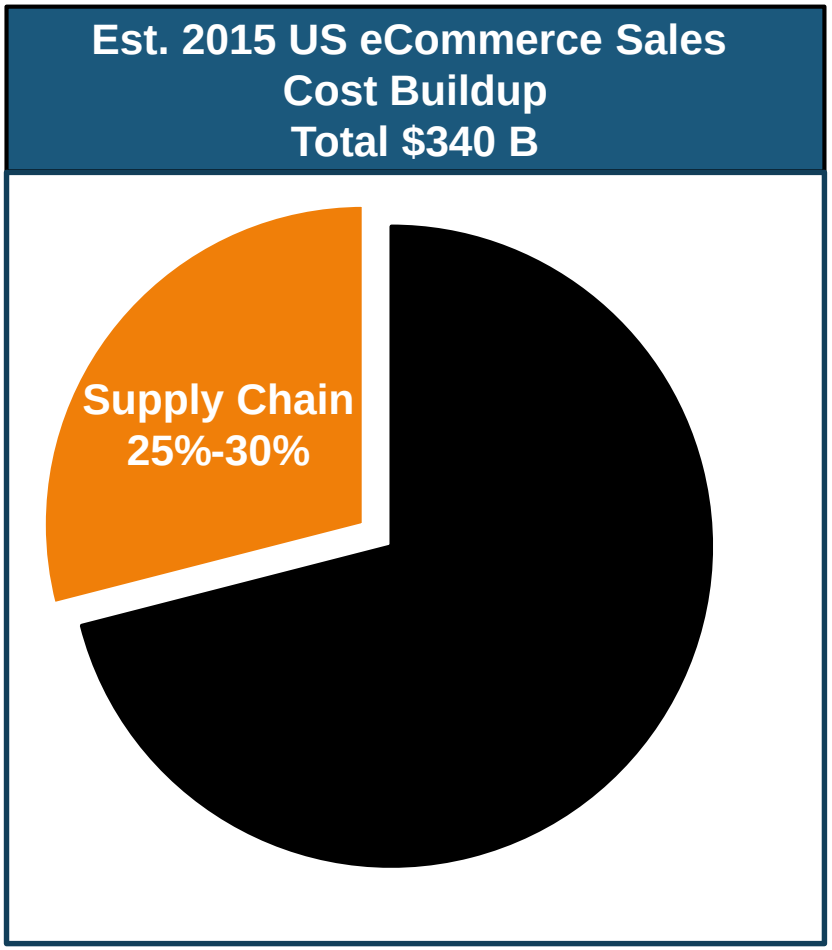
Amazon.com is by far the largest eCommerce retailer – and a leading influencer on the industry



Source: WSJ/Internet Retailer Top 500 Guide, AMZN financial statements and website; our estimates

- Top 10 account for 51% of the market
- Amazon.com accounts for about 27% of the US market
- Amazon "Marketplace" allows other companies to sell through Amazon.com website
  - Can include fulfillment by Amazon or retailer
- Amazon has led many online retailing trends
  - Free shipping
  - Free returns
  - Same day delivery
- Amazon adding own air and delivery capability
- 72 US DC's, more than 70 million ft2

Supply chain costs are an estimated 25% to 30% of the total eCommerce sales



Est. eCommerce Supply Chain Cost		
Category	**% Sales**	**Spend ($B)**
• Inbound	4-6%	$14-$21
• Fulfillment	5%	$17
• Inventory	6%	$21
• Outbound	6%-9%	$21-$31
• Returns	4.5%	$15
• TOTAL Supply Chain	25.5% - 30.5%	$88 - $104

- Assumes a well run supply chain
- If sub-optimal, costs escalate – fast!

Source: US Census Bureau; TandLA experience and model estimates

Agenda

- Market Size and Characteristics
- **Key eCommerce Trends**
  - **Companies Building Capabilities**
  - Transportation Models
  - Fulfillment Models
  - Relative Economics

eCommerce is still in a state of flux — making it difficult to plan and manage the supply chain

Changes	Key Questions and Issues
• How companies go to market	• Manufacturers/distributors – Sell through traditional retailers? – Sell through Amazon and other eTailers? – Sell direct through brand website? – Channel conflicts? • Retailers – Omni-channel approach – Marketplaces
• Customer expectations on product delivery times	• Slow and cheap or fast and expensive? • Free shipping expectations? • What will consumers demand and pay for? • How to compete with Amazon?
• Customer expectations on ability to return products	• Free shipping of returns? • Consumer mentality — buy 3, return 2 • Where and how to process returns?
• Fast growth	• What volumes should be planned for • How to maintain flexibility

Most companies are set up to ship and receive pallets, not packages — companies have to add new capabilities

	Traditional Warehousing	eCommerce Fulfillment
Outbound Shipment Volume	• DC to DC/store • Low volume of large shipments (TL or LTL)	• DC to consumer • High volume of small shipments (parcel)
Warehouse Operations	• Stacked pallets, moved with fork lifts • Staging of multiple pallets to move into trailers • Limited handling or packaging — some mixing, shrink wrapping	• At individual product level • Manual picking routes • Packaging lines • Pallets of packages for parcel carriers • Can be highly automated picking systems with large capex investment

Technology to support single pick is very different and requires additional capabilities

- Inventory management at various levels
  - Pallet
  - Case
  - Each
- Order picking
- Premium on real-time information — in both directions
  - What is in-stock
  - Applying orders immediately to inventory
  - Shipping cost
- Integration with various systems, often cross-company
  - Web “front end” (Demandware, IBM, Oracle, SAP)
  - Various order management systems (Jagged Peak)
  - Warehouse management systems (JDA, Manhattan)
  - Various ERPs (SAP, Netsuite)
- More complex returns

Returns and sales spikes are other eCommerce differences that increase the supply chain challenge

- Returns are much higher in many product categories
  - 20-30% of apparel purchased online
  - ~10% of hard goods (home goods, toys) purchased online
  - 87% of retailers allow for online returns to their stores — encourages additional purchases
  - Free shipping encourages returns
  - Sometimes a part of the sales model
- Sales spikes are greater than in physical stores
  - Flash sales
  - Subscription models

Sources: Kurt Salmon; TandLA experience

Brands/manufacturers have to become capable of shipping parcel to customers in addition to pallets

Traditional Model	eCommerce Fulfillment	Issues/Challenges
• Most brands traditionally sold through retailers – DC to DC or retail stores – TL or LTL • Returns were handled by the retailer	• Selling direct-to-consumer through their own websites or marketplace • Increase in drop ship • Higher individual product returns	• Channel conflicts • Sell through Amazon? • Inventory management • Pick, pack, and parcel ship capabilities • Dedicated eFulfillment center? • DIY or outsource? • How handle returns?

Traditional retailers have to determine how to fulfill eCommerce orders in an "omni-channel" world

Traditional Model	eCommerce Fulfillment	Issues/Challenges
• Retailers stocked their stores – From DCs – Palletized shipments • Returns to stores, but lower volume	• Many retailers have eCommerce presence • Channels blur — "omni-channel" • Returns to stores or fulfillment centers	• Do out of existing DC or dedicated eCommerce facility? • DIY or outsource? • Fulfill from stores? • Drop ship? • Sell through Amazon? • Business logic for where to fulfill from • How handle returns?

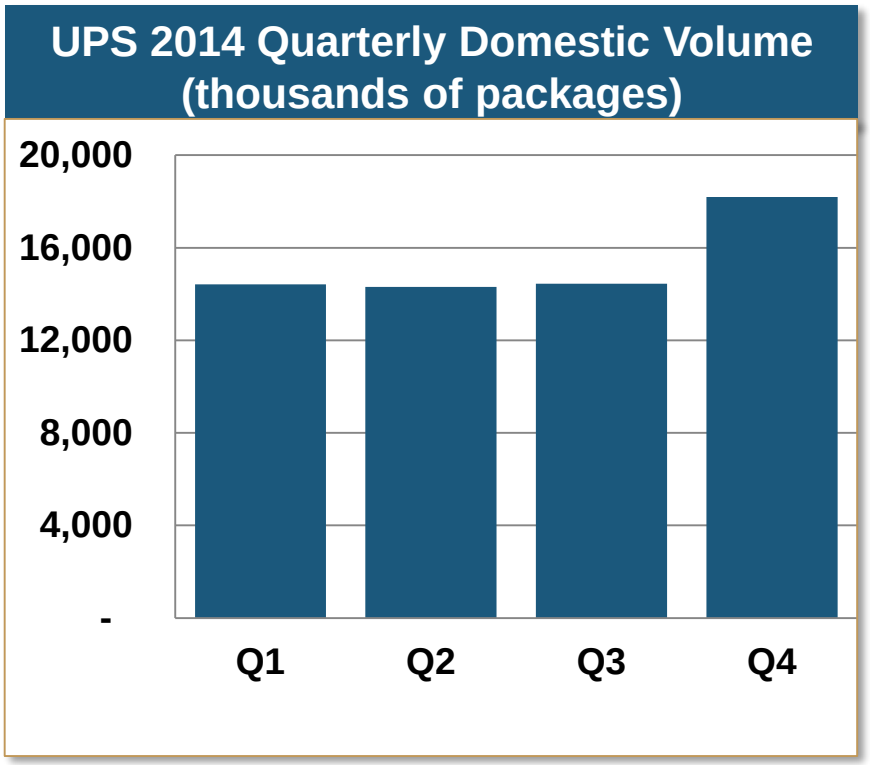
Web-only retailers are designed for direct to consumer — but they need to fulfill orders efficiently as they grow in size

Traditional Model	eCommerce Fulfillment	Issues/Challenges
• Their model is an eCommerce model	• DCs are designed for eCommerce — pallets in and parcel out • Mix of company controlled vs. outsourced fulfillment centers • Typically start with a single DC	• DC strategy as company grows, product categories increase – Dedicated versus shared DCs – Single versus regional DCs (and locations) – Centralized returns versus out of each DC – Outsourced versus insourced • How to compete with Amazon

Agenda

- Market Size and Characteristics
- **Key eCommerce Trends**
  - Companies Building Capabilities
  - **Transportation Models**
  - Fulfillment Models
  - Relative Economics

B2C eCommerce deliveries are highly seasonal – creating capacity challenges



- UPS 2014 Q4 domestic package volumes was 26% above Q1 – Q3 average
- Building the church for Easter Sunday
- Parcel carriers balancing adding capacity for holiday peak with higher yields
- Amazon building out it transportation and delivery capabilities

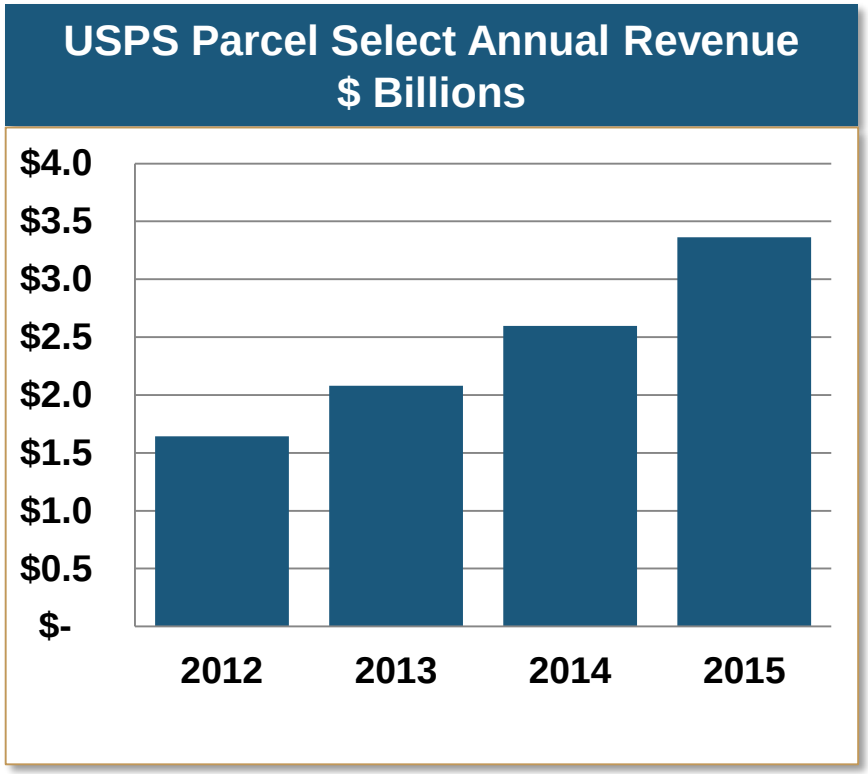
Sources: UPS 2014 Quarterly Earnings Releases; TandLA expertise

There are a range of delivery options at different service levels and price points

	Express	Ground	USPS Delivery (DDU Induction)	Same Day
Carrier	• Parcel carrier air or ground	• Parcel carrier ground	• Parcel carrier does bulk pick-up, line haul • USPS provides final mile delivery	• Courier delivery
Speed	• Next Day/2nd	• 2-5 days	• 2-7 days	• Same day
Cost	• High	• Medium/Low	• Low	• Highest
Position	• Easy, but expensive	• Easy, less expensive	• Lowest service • <5 Lb. packages	• Amazon ramping up • Difficult for many others to follow

Oversized products can come LTL or specialized 3PL

DDU Induction (called Parcel Select by USPS) products are growing fast as a low cost parcel option



- USPS "Parcel Select" product growth has been rapid
  - 2012 – 2015 Revenue CARG: 27%
  - 2012 – 2015 Volume CARG: 16%
- Companies specialized in DDU induction, like Newgistics, have been growing fast
- The USPS could change its DDU induction pricing to make its parcel products more competitive
  - Parcel Select 2012 Revenue/Package: $1.32
  - Parcel Select 2015 Revenue/Package: $1.74

Sources: USPS Annual Reports; FedEx financial filings; Stifel Nicolaus; UPS 2014 Annual Report; TandLA expertise

Same day has traditionally been viewed as too costly, but Amazon is making an aggressive push

Advantages	Challenges
• Highest speed to customer • Best alternative to physical shopping ("need it now")	• Inventory must be close to customers • Very difficult to have density to make delivery low cost

- Amazon offerings
  - 1 and 2 hour delivery (Prime Now)
  - Sunday delivery
- Retailers offering same day through 3PLs such as Deliv

Amazon Prime Same Day Free Shipping Cities - 2015

Amazon Prime Same Day Free Shipping Cities - 2016

Sources: Amazon.com, Best Buy website; TandLA expertise

Changes to dimensional pricing could impact some eCommerce shippers

Description	Impact
• FedEx and UPS instituted dimensional pricing for ground shipments • Parcel pricing now based on both package weight and dimensions	• Shippers of relatively large, low weight packages pay higher parcel rates • Increased emphasis on better packaging • Potential to add products to a shipment without adding shipping cost

Other changes could play out over time

Drones	UBER-Model
• Potential for lower cost delivery? • Many hurdles to be overcome – Regulatory – Legal – Economics	• Package delivery as part of shared economy • Questions remain – Density to make economics attractive? – Reliability and accountability? – Contractor model? • Deliv is an early example

Agenda

- Market Size and Characteristics
- **Key eCommerce Trends**
  - Companies Building Capabilities
  - Transportation Models
  - **Fulfillment Models**
  - Relative Economics

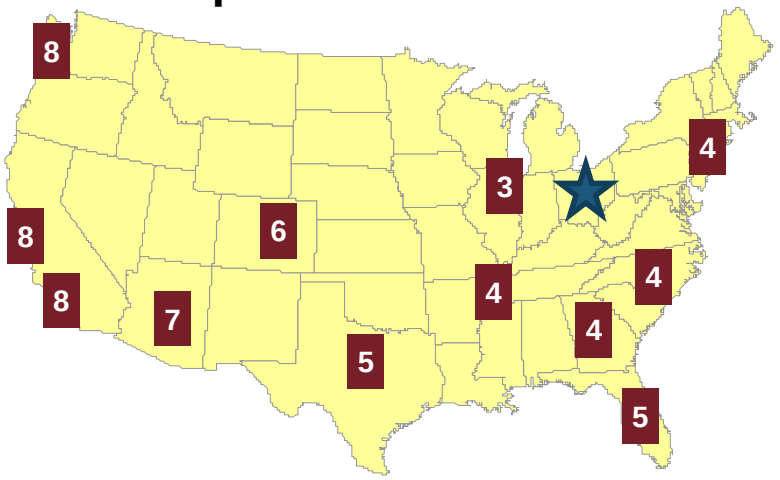
Companies fulfill orders from various locations

	Advantages	Dis-Advantages
Dedicated Fulfillment Centers	• Processes, product flows designed for single pick • Does not disrupt pallet-based warehousing • Can be highly automated	• Can be higher cost • Typically higher overall inventory levels
Carve-Out of Existing DC	• Utilize existing space and work force • Typically lower overall inventory levels	• Typically only viable at certain volume levels • Can make both pallet based and single pick less efficient
Stores	• Close to customers • Existing space and inventory	• Not designed for outbound shipping • Use of staff time

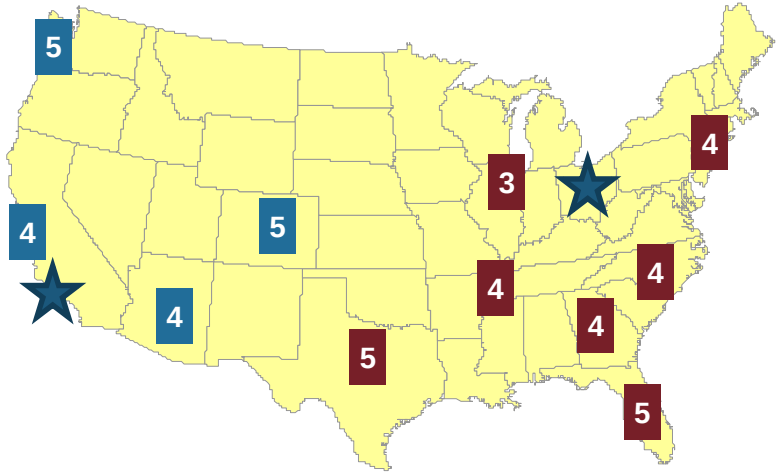
Companies that have the required scale can utilize multiple fulfillment centers

- Multiple DCs can lower transportation costs and improve service
  - Asian imports
  - Shorter parcel zones
  - Faster ground shipments
- However — there are some trade-offs
  - Need volumes to support to DCs
  - Likely requires increase in total inventory

Example UPS Zones – 1 DC



Example UPS Zones – 2 DCs



Sources: UPS website; TandLA expertise

Many companies outsource fulfillment to a 3PL to gain more sophisticated capabilities

Outsourcing Benefits	Leading Players
• 3PL invests in technology • 3PL expert in handling “eaches” • Can use space in a shared facility to gain scale benefits • Faster way to build capability • Can be lower cost – Non-union • Fulfillment is non-core for many companies	• Amazon Fulfillment • Radial • Ingram Micro • PFSWeb • Speed Commerce • Newgistics • Saddle Creek

Agenda

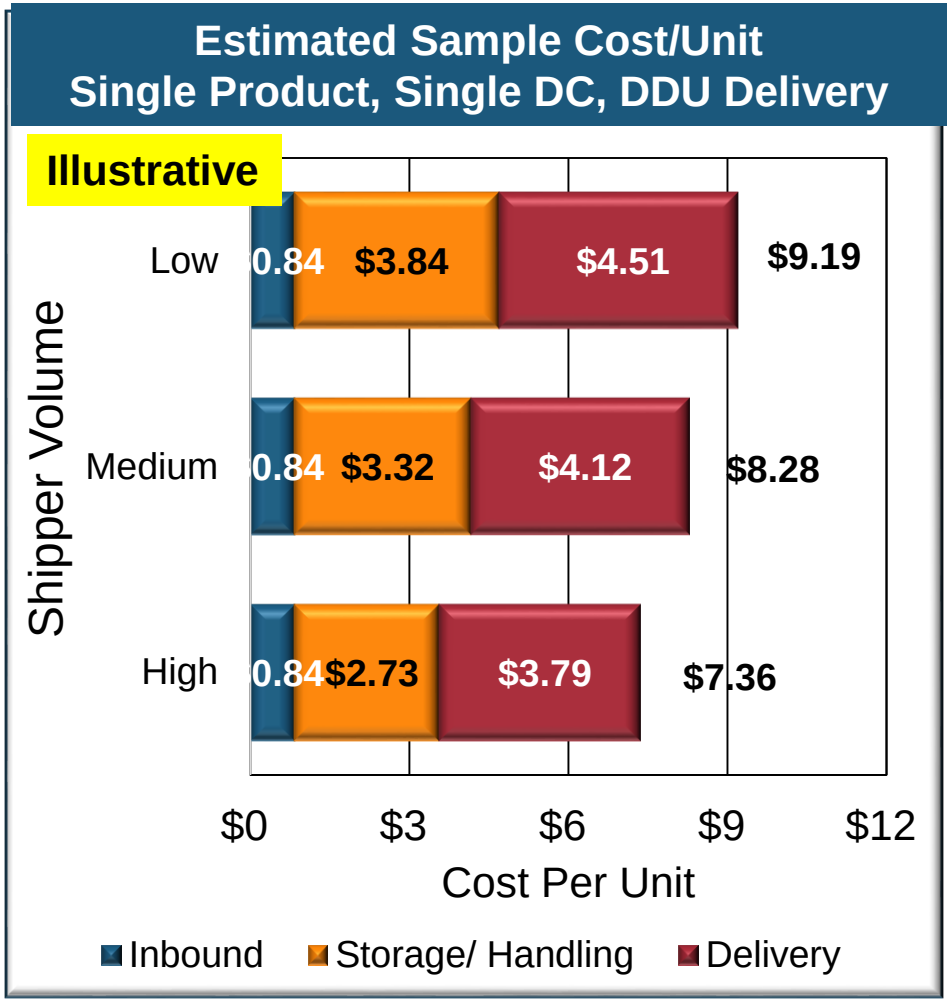
- Market Size and Characteristics
- **Key eCommerce Trends**
  - Companies Building Capabilities
  - Transportation Models
  - Fulfillment Models
  - **Relative Economics**

There are many drivers to lower eCommerce supply chain costs — companies must balance across them

Drivers to Lower eCommerce Supply Chain Costs				
Inbound Cost	**Facility Cost**	**Handling Cost**	**Inventory Cost**	**Delivery Cost**
• Volume to support full loads • Multiple facilities to limit distance, re-shipping	• Scale benefits — dedicated or shared • Low cost locations • Amount of inventory	• Increased automation • Managing staffing to volume • Intelligent picking logic • Less complex product profile • Multiple products per shipment	• Fewer facilities = less inventory • Tech to manage inventory as pool • Faster inventory turns • Cost of capital	• Service level • Distance from customer • Volume to support density • Number of products per shipment

Based on some example moves TandLA has modeled, shipper size plays a major role in supply chain costs

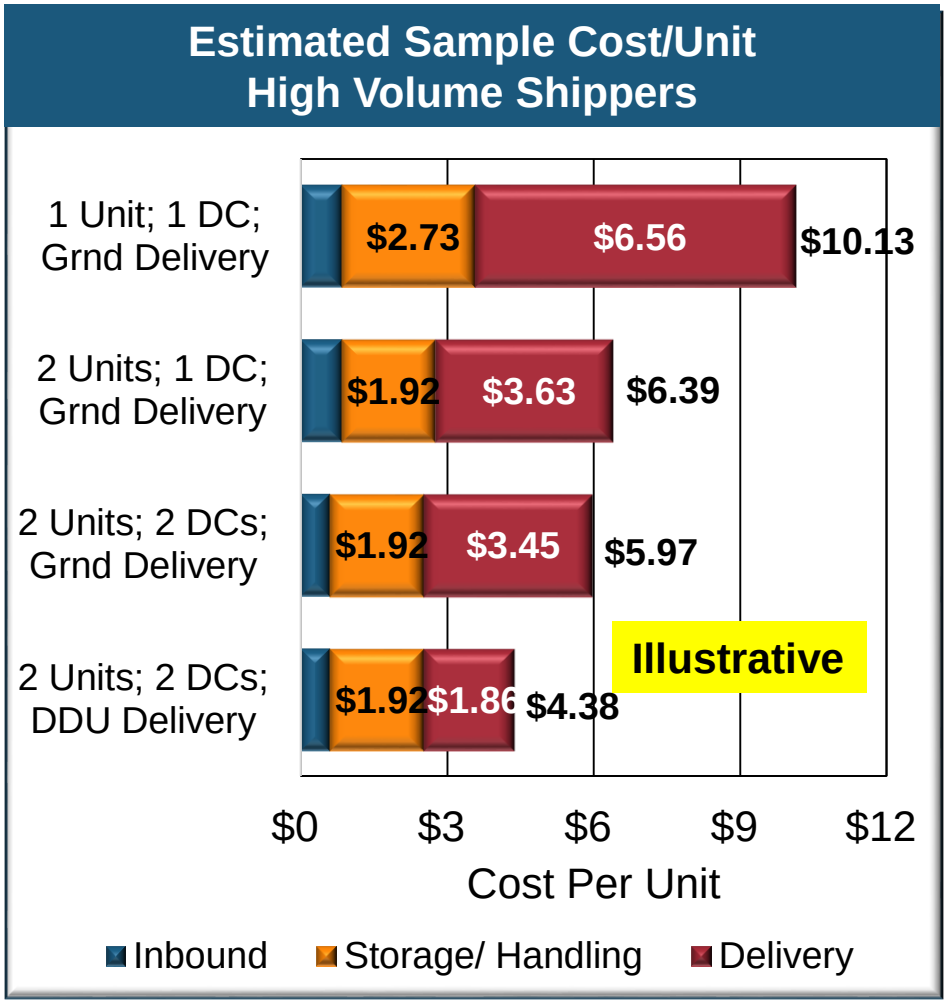
- We have modeled some eCommerce supply chain estimates based on example package, volume, and handling characteristics
- Largest cost categories are Outbound Shipping and product handling and storage cost
- Estimated economics for a large shippers are estimated at 20% lower than for a small shipper



Sources: UPS and USPS websites, FedEx financial filings, client fulfillment economics, Stern School, Port of LA/LB; TandLA estimates

Based on the example moves, economics change significantly based on supply chain and products/shipment

- Inbound transportation cost benefits from local move from port in 2 DC scenarios
- Handling cost benefits from multiple products per customer shipment
- Delivery cost benefits from multiple products per shipment
- DDU induction rates are much lower than standard ground rates



Sources: UPS and USPS websites, FedEx financial filings, client fulfillment economics, Stern School, Port of LA/LB; TandLA estimates