



Urban Freight Distribution Study

E-Commerce Trends and Implications for Regional Planning



Transportation Advisory Board

July 19, 2023

Background



Why study e-commerce trends and impacts now?

- Current growth trends in e-commerce activity are rapidly changing how and where consumers shop for goods
- Role of transportation in contributing to global climate change offers opportunities to consider new and more efficient systems and technologies
- Study identified in 2040 Transportation Policy Plan work program

Study Purpose

The purpose of this Study is to...

- Gain better understanding of trends in retail shopping/e-commerce purchases, warehouse/fulfilment center siting and operations, and last-mile parcel deliveries
- Estimate impacts of increasing e-commerce on the region's overall vehicle miles traveled (VMT) and associated greenhouse gas emissions (GHGs)
- Identify potential land use strategies to increase efficiency and reduce regional VMT
- Assess best practices in curbside management for commercial deliveries and last-mile modal technologies

Study Purpose (2)

The results of this Study will be used to...

- Inform the 2050 Transportation Policy Plan implementing policies and actions
- Inform the Land Use policies and actions in the 2050 Regional Development Guide
- Provide new guidance for Comprehensive Plans and implementation of plan to local governments in future updates of the Met Council's local planning guidance

Study Advisory Group

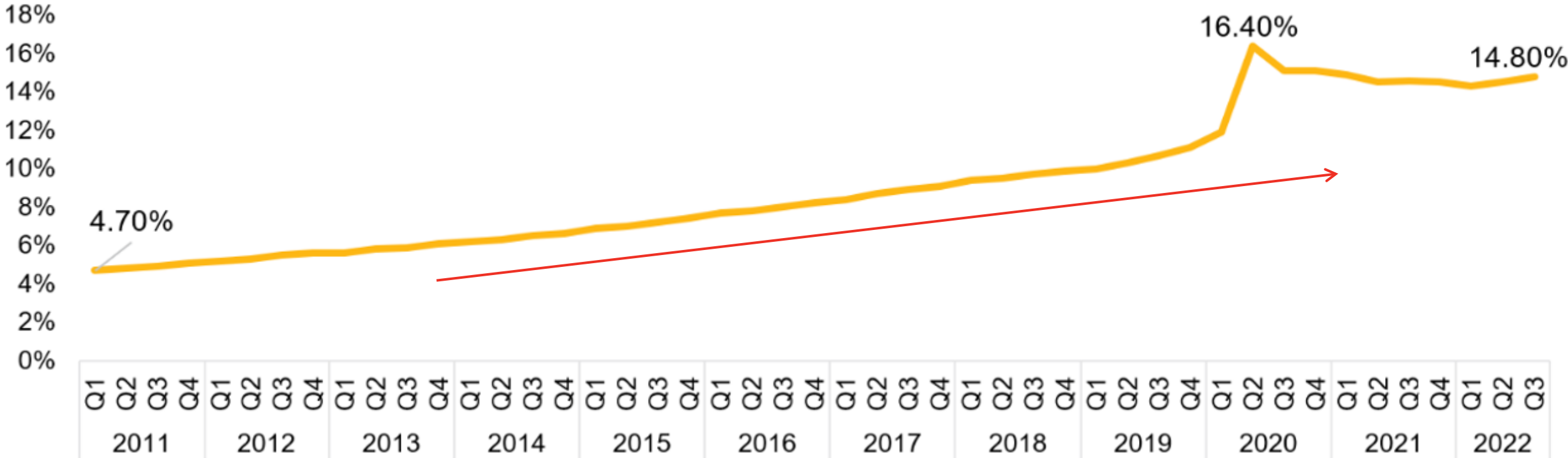
Technical Advisory Group includes these planning agencies:

- MN Freight Advisory Committee
- Metropolitan Council
- MnDOT
- City of Saint Paul
- City of Minneapolis
- City of Eagan
- City of Lakeville
- City of Maple Grove
- City of Rogers
- City of Roseville
- City of Shakopee

- City of Woodbury
- Anoka County
- Carver County
- Dakota County
- Hennepin County
- Ramsey County
- Scott County
- University of Minnesota

E-Commerce Trends

US quarterly e-commerce sales as percentage of total retail sales



Source: CPCS analysis of Federal Reserve Economic Data, St. Louis Federal Reserve Bank, 2023.

E-Commerce Trends (2)

National trends in sales and deliveries

Largest e-commerce retailers


50%



The largest e-commerce retailers are represented by logos for Apple, Amazon, Walmart, Target, and eBay. The logos are arranged in a grid: Apple and Amazon are in the top row, Target and Walmart are in the middle row, and eBay is in the bottom row.

Largest e-commerce delivery providers

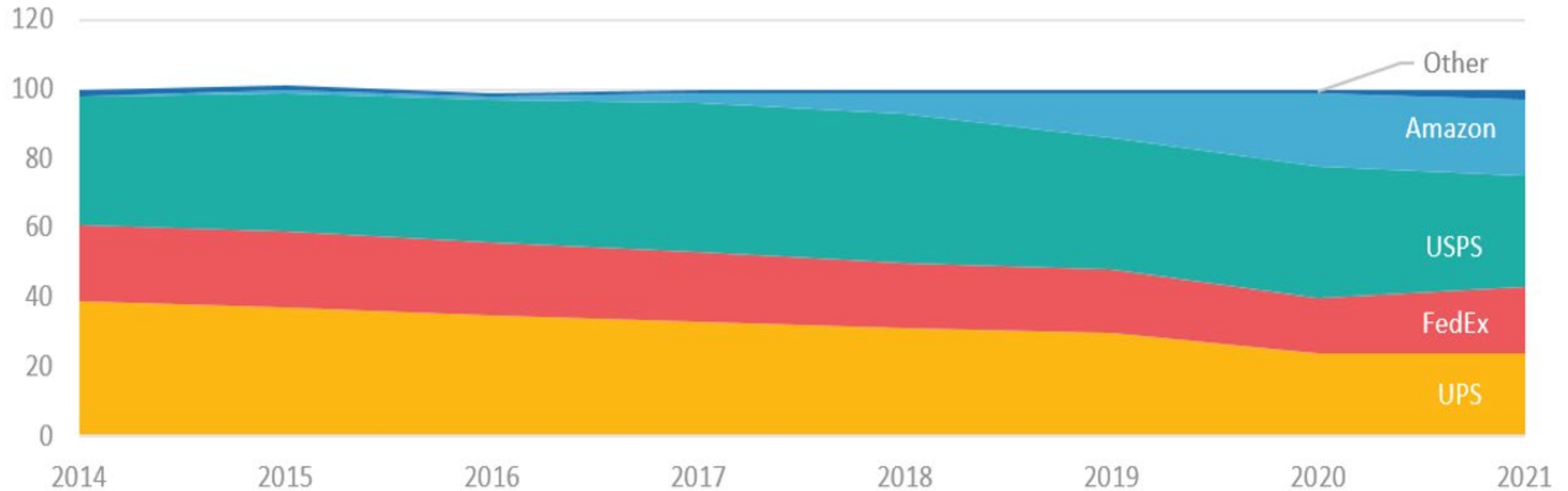
99%



The largest e-commerce delivery providers are represented by logos for United States Postal Service, Amazon Logistics, UPS, and FedEx. The logos are arranged in a grid: United States Postal Service and Amazon Logistics are in the top row, UPS and FedEx are in the bottom row.

E-Commerce Trends (3)

Market share of U.S. parcel volume, 2014-2021



Source: Pitney Bowes

Study Work Scope

The Study will have three main areas of focus:

Part I: E-Commerce trends and sustainability impacts

- Trends in online purchases, shipping practices
- Impacts of e-commerce on regional vehicle miles traveled (VMT) and associated greenhouse gas (GHG) emissions

Part II: Trends in siting of warehouse/distribution centers

- Trends in e-commerce fulfillment center siting and logistics management
- Opportunities for land use strategies to minimize VMT and GHGs

Part III: Curbside management & new technologies for last-mile deliveries

- Best practices for managing curbside space for delivery vehicles and other users
- Opportunities for emerging technologies to reduce VMT and GHGs

Study Work Scope (2)

PART I: E-Commerce Trends and Sustainability Impacts

Key Research Question:

To what degree does increasing e-commerce activity and its related changes in personal shopping trip behavior increase or decrease VMT & associated GHGs?

Key Work Tasks:

1. Assess current trends in online consumer purchases and shopping behavior
2. Estimate net change in regional VMT due to e-commerce activity for current year and 2050 planning horizon
3. Estimate net change in fuel consumption and GHG emissions based on net VMT estimates

Study Work Scope (3)

PART II: Trends in Siting of Warehouse/Distribution Centers

Key Research Questions:

What are various regional-scale land use or other strategies for siting major freight distribution centers that could minimize VMT & associated GHG emissions?

What are practical and sustainable strategies for locating parcel freight microhubs?

Key Work Tasks:

1. Assess trends in warehousing/fulfillment center development and logistics management relating to e-commerce parcel distribution
2. Compare land use-related policies and strategies for managing the impacts of e-commerce parcel distribution in other cities and metropolitan regions in the U.S. and Canada
3. Investigate trends in retail store closures, particularly for stores most likely impacted by the shift to online purchases
4. Identify potential new or amended policies, strategies and/or actions for the 2050 Transportation Policy Plan and 2050 Regional Development Guide land use chapter

Study Work Scope (4)

PART III: Curbside Management & New Technologies for Last-Mile Deliveries

Key Research Questions:

1. What are best practices for managing curb space for urban deliveries?
2. What new or emerging technologies hold the most promise for reducing VMT and overall emissions of greenhouse gases?; specifically, what are the potential benefits of promoting these or other emerging technologies for “last-mile” parcel deliveries?:
 - Air-based drones
 - Land-based drones (i.e., robots)
 - Cargo e-bikes
 - Automated (driverless) vehicles
 - Lower and zero-emission fuels



First Federal Aviation Administration Certification announced for commercial package delivery using drones April 25, 2019

Study Work Scope (5)

PART III: Curbside Management & New Technologies for Last-Mile Deliveries

Key Work Tasks:

3. Research current trends and best practices in curbside management for urban deliveries
4. Research new and emerging technologies for performing last-mile deliveries
5. Identify potential new or amended policies, strategies and/or actions for the 2050 Transportation Policy Plan and 2050 Regional Development Guide land use chapter

Early Observations

1. There are 4 major e-commerce delivery providers, each with a network of facilities

- Major e-commerce delivery providers are UPS, FedEx, USPS, and Amazon
- FedEx is combining its Express and Ground operations, which will improve route efficiency
- Amazon is notable for using “Flex” drivers to deliver packages in private vehicles
- Typical catchment area radius for a delivery facility is around 30-45 minutes; typical delivery vans carry ~200 packages



Early Observations (2)

2. There has been a regional shift in demand for land from commercial to industrial

- Traditional retail establishments such as malls and big box stores are less in-demand
- For example, Target and Walmart both closed big box stores in Brooklyn Center in recent years
- In contrast, industrial development in areas like Woodbury is expanding rapidly
- Industrial facilities are also being built on-spec, i.e., without an identified buyer



Early Observations (3)

3. Urban densification typically increases demand for curb space for deliveries and passenger travel modes

- In dense urban areas such as in the Minneapolis' Warehouse District, curbside space is at a premium
- Curb access for delivery vehicles is important, particularly when a shop, business, or multi-unit building does not have dedicated off-street loading facilities
- Delivery vehicles may compete for space with parking or may be forced to navigate and occupy space for other uses such as bicycle and bus lanes



Key Dates and Deliverables

Deliverable	Date
Project Kickoff	March 2023
Part III Draft Tech Memo: Curbside Management and Last-Mile Technologies	June 2023
Part II Draft Tech Memo: Trends in Siting Warehousing and Distribution Centers	Late July 2023
Part I Draft Tech Memo: Sustainability Impacts	September 2023
Draft Final Report	Fall 2023
Final Report	January 2024

Questions?

Thank you

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