

DRISI

CALTRANS DIVISION OF RESEARCH,
INNOVATION AND SYSTEM INFORMATION

Research Notes

Planning, Policy
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Programming

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Project Title:
Impacts of e-commerce on
warehousing and distribution in
California

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Task Manager:
Connor Campbell
Transportation Planner
Connor.Campbell@dot.ca.gov

Impacts of e-commerce on warehousing and distribution in California

WHAT IS THE NEED?

E-commerce is increasing around the world. In the US, e-commerce is increasing about 11% annually, much greater than the rate of total retail sales (3-4%), and the market share is now 15%. The global market share is estimated to be 20% in 2021 and valued at nearly \$5 trillion. The emergence of online shopping has transformed where and how goods are produced, distributed, and sold, and how consumers make shopping as well as shopping travel decisions.

E-commerce is changing rapidly. The variety of goods available continues to grow, and many new products have emerged, such as ingredients and instructions for home-prepared meals (e.g. Blue Apron) and subscription deliveries of frequently used products. Speed of delivery is also increasing. Large online retailers offer 'instant deliveries' (within two hours) in cities, and one-day delivery is now routine in many metropolitan areas. More recent changes include prepared food deliveries from industrial kitchens and the emergence of individual deliveries by cars (Uber Eats) or bicycle (Grub Hub).

The growth of e-commerce has impacts on both transportation and urban form. First, freight flows become increasingly fragmented as more retail products are delivered to individuals rather than retail stores, delivery times shrink, and more products get delivered as individual shipments. Fragmentation increases vehicle miles traveled (VMT). Increased VMT in turn generates more congestion, air pollution, and energy consumption. Second, to fulfill short delivery times, retailers must be as close to customers as possible. In-city warehouse and distribution space is therefore in high demand, but land prices and other constraints limit the size and number of facilities. The supply chain has responded with more complex distribution networks: large facilities in less urbanized areas serving as hubs for in-city distribution. It is therefore timely to examine how e-commerce may be restructuring supply chains and changing patterns of warehousing



DRISI provides solutions and
knowledge that improves
California's transportation system

and distribution (WD) location, which in turn affect goods movement on the highway system.

WHAT ARE WE DOING?

This research examines WD trends in California from 2014 through 2021, the latest year of data available. Trends are examined at several geographic levels: state, region, metro area, county, and zip code. Expected results include the following: 1) description of spatial trends in WD location patterns, 2) understanding of how spatial trends are linked to e-commerce and related changes in supply chains, 3) implications for state and local planning. Results will provide a greater understanding of the ways that e-commerce related changes in the supply chain are affecting California and how these changes can be best managed to achieve sustainability and equity goals.

The specific tasks are as follows:

- Develop a literature review
- Collect the data
- Perform a descriptive analysis
- Perform a statistical analysis
- Prepare and submit final report

WHAT IS OUR GOAL?

The purpose of this research is to document and analyze trends in location patterns of WD activity in California over the past decade, and to explore the relationship between these trends and the growth of e-commerce. This research builds on a previous study of WD trends in California 2003-2013 and extends to 2021.

WHAT IS THE BENEFIT?

The primary benefit of this research is an increased understanding of how the various warehousing and distribution facilities across California have been located over the past decade in order for companies to increase and adjust their

capacity for the vast increase in ecommerce and delivery demand. Results of the research will provide a better understanding of freight dynamics and what they imply for state freight planning and management. Warehousing and distribution facilities are major freight generators. Understanding these trends will support truck parking plans, highway improvements, placement of public truck charging facilities, and much more. As Caltrans continues to plan toward a more sustainable freight future it is imperative that we understand recent historical distribution to better forecast our planning out toward the future.

WHAT IS THE PROGRESS TO DATE?

This task has started, had its kickoff meeting, and will have its upcoming first quarterly meeting sometime in May this year.

IMAGES



Image 1: Warehouses in Los Angeles, California (Los Angeles Business Journal, 2022)