E-Commerce and Emerging Logistics Technology Research

Key Takeaways – What we learned:

- Between 2010 and 2017, U.S. e-commerce retail sales grew from $165 billion to $453 billion, a 175% increase while total retail sales grew by only 29% (US Department of Commerce).
- Nearly 70% of all Americans made on-line purchases with the highest in the 18 to 29 year-old cohort and the lowest in the 60 to 69 year old cohort.
- Between 2009 and 2017, the average number of monthly online deliveries per household more than doubled from 2.4 to 4.9 (National Household Travel Survey/FHWA).
- Between 2015 and 2017, Oregon on-line sales jumped by 50% (Oregon Office of Economic Analysis).
- Over the past year alone PDX air cargo plane traffic grew by 12 commercial flights per day attributed to growth in e-commerce.
- In 2017, Amazon accounted for 5% of all U.S. retail sales and 49% of all online retail sales.
- Amazon's same-day deliveries are pushing companies to compete with for faster delivery speeds to meet customers growing expectations for fast deliveries.
- This growth is directly tied to the convenience and competitiveness of ecommerce shopping versus conventional brick-and-mortar shopping, including quick (often one day, and sometimes two-hour) and free delivery, hassle-free returns, and the complete assortment of commodities.
- To accomplish the quick delivery requirements:
    - Warehouses and distribution centers are locating from ex-urban locations to sites within or close to the central city to be closer to their customers.
    - Shippers and carriers are using a wide assortment of delivery modes including smaller trucks, vans, cargo bikes, TNCs (transportation network companies), personal cars, and in some locations licenses drones, bots, and AVs
    - Carriers have expanded their work weeks to 7-days, extended workdays, and hired an unprecedented number of couriers, drivers, sorters, inventory managers, etc.
- In Portland, vacancy rates for industrial warehouse space dropped from 7.2% in 2011 to 3.5% in 2018, and regional warehouse jobs grew by 21% between 2005 and 2018.
- Between 2000 and 2018 the average mileage of long-haul trucks decreased nationally by 300 miles, or 37%. Despite reduced long-haul truck mileage, vehicle miles traveled increased 18% between 2011 and 2016, primarily due to significant growth in short-haul and last-mile truck trips. (American Transportation Research Institute).
- Supply chains and corresponding logistics strategies are being modified to meet the increased demand for same and next day deliveries.

Stakeholder Input – What we heard:

Trends

- Warehouse and fulfillment centers will be increasingly automated with improved inventory management and located closer to consumers.
- Carriers are extending delivery hours and adding more fleet vehicles and drivers to meet increased delivery demand.

- While smaller personal-sized vehicles (cargo vans, e-trikes, hand carts) will become a regular part of last-mile delivery, 90% of all e-commerce deliveries are still made by truck.
- Partnerships between cities, carriers, and shippers is key to resolving delivery issues.
- Cities can manage curb parking and loading spaces through real-time monitoring sensors.
- Warehouses and fulfillment centers are moving closer to city centers to help expedite last-mile delivery demand.
- Technology, smaller sized vehicles, extended delivery hours, and increased carrier staffing are all part of the range of solutions to addressing last-mile delivery requirements.
- Crowd sourcing and "hand-offs" between modes are other growing trends in accomplishing e-commerce delivery.

Challenges

- Congestion and lack of available curb space to complete last-mile deliveries on schedule.
- Safety conflicts between trucks and vulnerable road users which will grow more challenging with our expected increased volumes of trucks, pedestrian and bicycle traffic.
- Attracting the necessary personnel to meet the rising demands for e-commerce deliveries.
- Goods movement demand is growing faster than population and 90 percent is by truck.
- Freight logistics are continuously changing and it's challenging for cities to develop long-term solutions.
- Managing curb demand – enforcement and maximizing use while accommodating bus and bicycle lanes.
- Developing policies for reducing diesel and GHG emissions.
- In the Portland region we don't yet have an accurate grasp about how much vehicular traffic is being generated by e-commerce deliveries.

Recommendations

The following eleven recommendation are initiatives that can be implemented either by the City of Portland, by private sector service providers, or through a combination of public-private partnerships:

1. Analyze curbside usage in the central city by delivery vehicle.
2. Explore variable pricing of central city curb space.
3. Expand the number of satellite parcel lockers in various city locations for customer pick-ups.
4. Provide incentives for emission-free/low emission delivery vehicles.
5. Improve in-building management of deliveries
6. Develop an off-hour delivery program for central city deliveries.
7. Develop a "last-mile exchange" - aka crowd-sourced strategies to provide delivery options.
8. Develop central city logistics centers.
9. Direct trucks to available curb delivery spaces via a reservation app for freight loading zones.
10. Increase requirements for off-street loading facilities.
11. Develop form-based ordinances and building codes for reducing delivery traffic and on-street loading.