TRB 2020 Freight Day Topic 2 Sustainable and Efficient Solutions for Last Mile Distribution

Recent trends in last mile logistics solutions around the world

Dr. Laetitia Dablanc







Chair *Logistics City* University Gustave Eiffel (IFSTTAR) and Sogaris

> Metrofreight VREF Center of Excellence





Changes worldwide

- Global supply chains, technological changes, consumers' behavior, societal demands
- Converging urban logistics operations: DHL, iFood, Prologis... brands catering for metropolitan areas worldwide
- Start-ups, urban freight tech everywhere







- ♀ Same-Day delivery
- On-demand delivery
- ♀ Drones, Remote locations
- ♀ Self-Driving cars, Remote locations
- **9** Robots, Gated communities and closed
- ♥ campuses
- ♀ Storing packages for buyers to pick up
- **•** Maximizing Delivery
- ♀ Not-at-Home & Failed Deliveries
- ♀ Gated Communities, Residential
- **9** Buildings and Office Buildings
- ${\boldsymbol{\diamond}}$ Hospital Campuses, Corporate
- ♀ Campuses, and Universities

- **•** Algorithms and Analytics
- ♀ Delivery Drones
- **9** Delivery Robots
- **•** Autonomous Cars
- ♀ Autonomous Delivery Vehicle (ADV)
- ♀ Autonomous Ground Vehicles (AGVs)
- **•** Autonomous Pods
- **9** Robotics
- **9** Droid
- **9** Robot Delivery Technologies
- ♀ Van/Drone/Robot Integrated System
- **Ŷ** System of Systems
- ♀ Smart Door Lock
- **?** Trunk Delivery
- **9** Parcel Box
- **9** Parcel Locker
- Mobile lockers
- **?** Required Support Structure
- **v** Warehouse Locations
- **9** Unmanned Warehouses
- **?** Platooning
- ♥ Tracking Technologies
- ♥ Low-Density Cities
- **•** High-Density Cities
- Medium-Density Cities
- ♀ Same-day, Instant Delivery or Sunday delivery



Drones and robots for deliveries

- FAA recent approval for UPS on hospitals and campuses, tests from Wing/FedEx/Walgreens
- Swiss Post: delivery of pharmaceuticals in Zurich and Lugano
- JD in rural areas in China
- Flytrex in Rejkjavik, Island for Aha retail
- Nuro robots for Walmart and Kroger









"Home" deliveries, really?

	Manhattan	Paris
Home and in hands	29	27
To doorman	28	12
In mailbox	18	15
In a store (click and collect)	4	2
In an automated locker	1.5	0.5
In post office	1	5
In a pick up point	1	21
At work	1	4
Other		

6T, 2018

- Pick-up points are an increasingly popular option
- Shared delivery lockers: Cubee (Belgium Post)









On-demand instant delivery services

- Deliveries in two hours
- Smartphones and digital platforms
- Gig workers, self contractors
- Firms becoming global, volumes increasing ${}^{\bullet}$
- Provision of unskilled jobs in city centers of ulletmegacities

Kigali



Buenos

Aires

Change the way India eats

Mumbai

SWIGG





800 Flex cars per day in and out of each Amazon urban fulfillment center



Median number of departures per facility per day (Sacramento, 2019, from M. Jaller):

45 heavy trucks 250 delivery vans 795 Flex cars

Delivery Station



Informal logistics: low tech but efficient urban freight services



Dar es Salaam, Tanzania



Mumbai dabbawallas



Electric vans' slow but steady uptake



June 14-16th 2019

DHL StreetScooters FedEx and Chanje

Electrically assisted cargo-bikes increasingly popular in Europe



International Cargo Bike Festival Groningen

- Main advantage is access to bike lanes
- Berlin's KoModo, Montreal Colibri, Dutch City Hubs, Belgium's City Depot
- NYC to test the use of loading zones by cargo-bikes at no fee



Urban warehouse for Amazon Prime Now in Paris

Electric vans of delivery provider on roof







An electric freight barge on the Seine: Fludis

- Since September 2019 new barge from West port to central Paris
- Cargocycles on board
- Delivering parcels and pallets from Lyreco and IKEA on the way in; and Paprec electronic waste on the way back



Universite

Micro logistics hubs

- Micro consolidation centers in London for major parcel carriers, operating zero emission vehicles (cargo cycles or small vans): Zedify, Gnewt Cargo, DPD
- Fabric, Tel Aviv: automated micro-fullfillment centers



JD uses 400 micro-hubs in Beijin





'Logistics hotels'

- Innovative architecture, often on former industrial/rail areas or former parking buildings
- Multi-story
- Multi-use: logistics, retail, residential, offices
- Sometimes multimodal



Hôtel logistique de Chapelle international (18e arr.) inauguré en juin 2018. © JGP



Demand for e-commerce urban warehouses in Europe: a niche but growing (Cushman&Wakefield, 2018)





Source: Urban Space Model, Cushman & Wakefield

Innovation in public policy

- London Low Emission Zone: by October 2020 only Euro 6 trucks and vans
- **Shenzhen's** 62,000 electric vans by end of 2018 (RMI, 2019): exemption from freight vehicles' time restriction and strong municipal policy for charging stations' implementation
- Promotion of off-hour deliveries **NYC**
- Curbside management, Loading/unloading zones AreaDUM in **Barcelona**, Spain, **Seattle** Urban Freight Lab
- RFPs for converting gas stations and car parks into logistics facilities in **Paris**

Porte Champerret Sogaris project





Conclusion

- Smart city logistics solutions not only about technology
- Policies, architecture, infrastructure, informal logistics
- Training, opening job options
- Data collection, data analytics, urban freight models including emissions and carbon footprint forecasts



Resources

- <u>METROFREIGHT</u> <u>www.metrans.org/metrofreight</u>
- Sustainable Urban Freight Systems
- Urban Freight Lab: https://depts.washington.edu/sctlctr/urban-freight-lab-0
- CHAIR LOGISTICS CITY: www.lvmt.fr/en/chaires/logistics-city-sogaris/
- Conway, A., J. Cheng, C. Kamga, and D. Wan (2017). Cargo Cycles for Local Delivery in New York City: Performance and Impacts. Research in Transportation Business & Management, Vol. 24, p. 90-100.
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- CITYLAB (2018) Observatory of Strategic Developments impact urban logistics http://www.citylab-project.eu/deliverables/D2_1.pdf
- Paris instant delivery surveys: https://hal.archives-ouvertes.fr/hal-02374915





