New methods to collect urban freight data

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• Research oriented Chair
• Warehouses, innovations, new trends in consumption and impacts on city logistics

Results available online:
• Observatory of ecommerce mobilities
• Barometer of urban logistics under covid lockdown
• Logistics real estate and relationships with urban form in 74 large cities around the world

Understanding the drivers of urban goods movements

20 deliveries/day

one delivery/day
Concentration of deliveries and pick-ups generated in daily average in Paris

Coulombel et al., 2018, data from 2010 (LAET)
E-commerce mobilities: the great unknown

B2C deliveries per capita per day (Buildeo Rai & Dablanc from meta-analysis of literature and various business sources)

<table>
<thead>
<tr>
<th>City</th>
<th>B2C Delivery per Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amsterdam (The Netherlands)</td>
<td>0.050</td>
</tr>
<tr>
<td>Antwerp (Belgium)</td>
<td>0.008</td>
</tr>
<tr>
<td>Beijing (China)</td>
<td>0.001</td>
</tr>
<tr>
<td>Belo Horizonte (Brazil)</td>
<td>0.001</td>
</tr>
<tr>
<td>Belo Horizonte-Contorno (Brazil)</td>
<td>0.001</td>
</tr>
<tr>
<td>Bengaluru (India)</td>
<td>0.016</td>
</tr>
<tr>
<td>Berlin-Wilmersdorf (Germany)</td>
<td>0.017</td>
</tr>
<tr>
<td>Brussels (Belgium)</td>
<td>0.037</td>
</tr>
<tr>
<td>Dolo (Italy)</td>
<td>0.026</td>
</tr>
<tr>
<td>Lisbon-Barreiro (Portugal)</td>
<td>0.074</td>
</tr>
<tr>
<td>New York-Manhattan (USA)</td>
<td>0.021</td>
</tr>
<tr>
<td>New York-State Capital District (USA)</td>
<td>0.020</td>
</tr>
<tr>
<td>Paris-12 (France)</td>
<td>0.026</td>
</tr>
<tr>
<td>Rome (Italy)</td>
<td>0.026</td>
</tr>
<tr>
<td>Rome-freight restricted traffic area (Italy)</td>
<td>0.001</td>
</tr>
<tr>
<td>São Paulo (Brazil)</td>
<td></td>
</tr>
<tr>
<td>Shanghai (China)</td>
<td>0.056</td>
</tr>
<tr>
<td>Southampton (UK)</td>
<td>0.003</td>
</tr>
<tr>
<td>Toronto (Canada)</td>
<td></td>
</tr>
</tbody>
</table>
Rough estimates?

- *New York Times* March 4, 2021 “Roughly 2.4 million packages are delivered in the city every day, nearly half a million more than before the pandemic, and city data shows that 80 percent of deliveries are to residential customers, compared with 40 percent before the outbreak”
  \[= 0.23 \text{ parcel per day per person}\]

- *Le Monde* January 21, 2021: “According to head of Colissimo, there were one billion B2C parcels delivered in France in 2020”
  \[= 0.04 \text{ parcel per day per person (six times less)}\]

- A major survey made in Lyon in 2016 (LAET) = 0.02 parcel per day per person
- A future survey from a large research project ANR MOBS
At least 25% of last mile drivers are NOT in trucks or vans in Paris today

<table>
<thead>
<tr>
<th>Lorries</th>
<th>Vans</th>
<th>Cars</th>
<th>Mopeds</th>
<th>Cargo-cycles</th>
<th>Bikes</th>
<th>Pedestrian and transit</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Lorries" /></td>
<td><img src="image2" alt="Vans" /></td>
<td><img src="image3" alt="Cars" /></td>
<td><img src="image4" alt="Mopeds" /></td>
<td><img src="image5" alt="Cargo-cycles" /></td>
<td><img src="image6" alt="Bikes" /></td>
<td><img src="image7" alt="Pedestrian" /></td>
</tr>
</tbody>
</table>
Why get better data for urban freight?

• Support traffic management and city planning through better modeling of freight
• Monitor progress of an urban freight strategy
• Support decarbonization of freight through better impact assessments
• Provide tools for cost–benefit analysis of traffic regulations such as low/zero emission zones including positive and negative impacts on businesses
• Support better design of low/zero emission zones such as optimum size
• Stakeholder involvement:
  - Benchmark for freight companies
  - Freight joint strategy between all relevant local stakeholders, based on actual diagnostic and good data (build trust)
• Modeling/simulation of alternative city logistics models
Carbon footprint City of Paris 2004-2014

- CO₂ emissions from urban freight “decreased by 18% between 2004 and 2014” (official 2017 Carbon Footprint Assessment, City of Paris)
Local emissions from freight transport were underestimated mostly because delivery vans were under-estimated.

Data came from:
- the LAET B2B urban freight survey which dates from 2010 and does not take into account B2C deliveries
- the national “Light Commercial Vehicle use survey”
  - latest is from 2010 with much less B2C traffic
  - represents data for whole of France thus overestimating LCVs used by private individuals
- Local "plate surveys," which do not make it possible to distinguish between the different types of LCVs (many used by craftsmen or private individuals)
Motorized two-wheelers for delivery not taken into account in Paris carbon footprint assessment

• In Paris, 36% UberEats and Deliveroo couriers use a moped (2021)
New methods for urban freight data collection

- New ways of collecting data: a major area of progress for city planning (modeling mobility, evaluating policies, assessing carbon footprint)
- Data from telecom operators
- Data from logistics operators, e-retailers, delivery apps
- Open access data from various sources: OSM
- Data from municipal agencies
  - Automatic number plate recognition cameras for traffic enforcement
  - Open-access data such as a local bike-sharing service
Data from telecom operators

- A study by Roland Berger and Kisio in March 2020 using data from Orange (French main telecommunication operator)
- Huge misinterpretations due to lack of truck identification in telecom data
- Efforts to recognize ‘freight behaviors’ in mobility data
Réseau des entrepôts Amazon par type dans la région Nord-Est des États-Unis (Washington D.C-New York)

T. Lecourt, M. Schorung
Logistics City Chair, 2021

Sources: MWPVL®, OpenStreetMap Contributors

More open data for warehouses, example OpenStreet Map

Catégories d’entrepôts
- Fulfillment Center and Distribution Center
- Air Gateway
- Receiving or Inbound Cross Dock (IXD)
- Regional “First Mile” Sortation Center
- Pantry and Fresh Distribution Center
- Whole Foods Retail or Distribution Center
- "Last Mile” Delivery Station - Heavy/Bulky Merchandise
- "Last Mile” Delivery Station - Small Packages
- Prime Now Hub
Open-access data from municipal services

- Bike-sharing public service in French cities
  - Many electric bikes now used for instant deliveries
  - Mobility pattern of delivery couriers on Velib are not easy to figure out
  - Trip routes, places of pickup and delivery, volume of activity could be identified via AI
AreaDUM in Barcelona: also a way of collecting data

- Delivery drivers must register on a smartphone app (AreaDUM) including plate registration number
- Once arrived on unloading zone, must confirm their location
- A 30 minutes window then available for delivering
- Provides real time data to the municipality
ANPR data

• ANPR: Automatic Number Plate Recognition
• ANPR cameras to enforce low emission zones: UK, Italian, Spanish, Dutch, Scandinavian cities
• France just authorized them (2021) but under very strict conditions, no data can be used
• Ex. City of Amsterdam: once a year, one month of ANPR data is studied for research/modeling purpose
• Privacy issues prevent the use of more (or of “live”) data
• Swedish cities: use of ANPR data for research has not yet been authorized “it is really a pity to not be able to use data that is actually there” (representative of City of Gothenburg DOT, March 23, 2021)
Data sharing, partnerships with freight operators

- French legislation imposes data sharing from operators or new mobility services but freight data is not mentioned
- Universities go operator per operator (DB Schenker with univ Eiffel recently)
- Best example of partnerships: Dutch cities (especially Rotterdam)
- Don’t ask for data, ask for indicators!
• Dutch cities must implement zero emission zones that include freight by 2025
• They include a plan for a shared data model with potential benefits and incentives for companies sharing data such as prioritised access
• In 2019 Rotterdam established the Roadmap Zero-Emission City Logistics strategy
"The movement of goods is increasing in importance, as the rapid growth of e-commerce and to-your door delivery has led to more carrier fleets in city streets. The combined impact is staggering – in China for example, daily parcel deliveries are on track to hit 145 million by the end of 2020, nearly tripling from 57 million in 2015. All of those delivery vehicles have a significant impact on congestion and emissions."