A basic collaborative city logistics’ solution: the Urban Consolidation Centre

Lucile Faure, Guillaume Marquès, Patrick Burlat
Ecole Nationale supérieure des Mines de Saint-Etienne
France

Benoit Montreuil
Laval University, Faculty of Administration Sciences, CIRRELT
Canada
Contents

- The context
- The proposed approach
- An application of the methodology
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The context: which motivations?

[Roca-Riu et al. 2012], [Dablanc 2007]
The context: which motivations?

- City logistics:
  - 28% of the total transport cost
  - Between 16% and 50% of global pollution due to transport activity in the city
  - Noise
  - Attractiveness of city center

- How to concept sustainable and innovative logistics schemes?

[Roca-Riu et al. 2012], [Dablanc 2007]
The context: A lack of tools to help decision makers

- Lots of solutions are empirical and do not allow to provide sustainable models to public Decision Makers (DM)
- A need to establish ex ante assessment models to predict more precisely the impact of city logistics measures

- Urban Consolidation Center: most common city logistics measure

[Taniguchi et al. 2003], [Russo and Comi 2011], [Chwesiuk et al. 2010]
The context: The key role of interoperability

Which effects?

UCC

Inhabitant

Carrier 1

Carrier 2

Store 1

Store 2

Public Decision Maker
Our approach: the system under study

- **Multi-sources and multi-destinations logistics:**
  - **Multi-sources:** more than one carrier deliver the city
  - **Multi-destinations:** one delivery point can receive freight from more than one carrier
Our approach: the KPIs choice

- How to quantify the performance with the angle of sustainability?
  - The accumulated travel distance = cost and traduction of mobility
    \[ D_{Total} = \sum_{i=1}^{n} D_{Truck}^i \]
  - The total time = cost and service quality
    \[ T_{Total} = \sum_{i=1}^{n} T_{Truck}^i \]
  - The CO\textsubscript{2} emissions quantity = first source of greenhouse gas
    For each vehicle type
    \[ E_{CO_2} = \sum_{i} D_{Total}^i \times EF_i \]

[Patier and Browne 2010], [Henriot et al. 2008], [Van Rooijen and Quak 2010]
An illustrative case

- 2 types of vehicle:
  - Semi 26t, 94m³, 34 parcels
  - Truck 5t, 40m³, 16 parcels
2 types of vehicle:

- **Semi 26t, 94m**
  - 3, 34 parcels

- **Truck 5t, 40m**
  - 3, 16 parcels
An illustrative case

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Travelled distance: 347 km
Total delivery time: 14.5 h-vehicles
CO₂ emissions: 247 kg
From the concept to real cities
From the concept to real cities

- Beijing
- Moscou
- New Dehli
- Paris
- Québec
From the concept to real cities

Beijing, Moscou, New Delhi, Paris, Québec
From the concept to real cities

Beijing  Moscou  New Delhi  Paris  Québec
From the concept to real cities

Beijing
New Dehli
Paris
Moscou
Québec
An illustrative case

- Implantation of one UCC

Current situation

Situation with one UCC

- Travelled distance: -33%
- Total delivery time: -52%
- CO₂ emissions: -32%
Conclusion

- An approximation of the potential gain of a collaborative city logistics network
- One proposition of conceptualization and modeling of city logistics
Prospects

- Applied the method to a real case
- Extend the study to others city logistics actions: delivery areas but also other UCC?
- Use results into the future tool developed in the ANR project “ANNONA”
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