# City Logistics Policy Evaluation with System Dynamics

SD Transportation SIG, Vienna, 23 March 2018

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#### Freight transportation in urban areas: Relevance

150 50% 0,1delivery/collection per supply chains capita per day



Dablanc, L. 2009. Freight Transport for Development Toolkit: Freight Transport. World Bank Conto Nazionale Trasporti (2013)



of freight tons in Italy is transported within 50 km from the origin





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Freight transportation in urban areas: Impact on traffic and environment





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#### Freight transportation in urban areas: Impact on traffic and environment





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**City Logistics concept** 

CL is "the process of totally **optimizing urban logistics activities** by considering the social, **environmental, economic, financial and energy impacts** of urban freight movement" (Taniguchi et al., 2001).



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 For sustainable urban freight systems, operational efficiency and environmental benefits should be achieved together

 The multi-stakeholder environment calls for a combination of private initiatives and public policies





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## 2. Research Gap

#### Are CL projects catching on?





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### 2. Research Gap

#### Modelling CL from a different perspective

- The evaluation of CL projects has been the focus of several types of modelling techniques
- Modelling CL can be quite useful to understand and assess the impact of selected policies
- More research is needed to explore both operational and economic aspects of a CL system

Fully grasp the interconnections between actors and variables that shape the system









### Main variables and actors

#### Local administrations



**Transport operators** 

Strive for efficiency and profitability Bear the cost of regulations



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#### **Model structure**





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### 4. Conclusions

- The proposed SD model provide for a holistic and aggregated view on the effects of public and private policies in a CL system
- Global outputs of the system itself in terms of economic gains and losses as well as environmental sustainability can be calculated
- Such view enables the modeler to draw useful insights on the topic at issue that might be otherwise overlooked.



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### 5. Future research

#### Assess the impact of policies with SD

- 1. Quantitative functions between variables
  - 1. Literature Review
  - 2. Delays!
- 2. Integrate with available traffic and emission models
- 3. Devise policy scenario and targets
- 4. Run simulations!



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### Thank you!

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